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# A Sane View of the Aircraft Engineering Future

**The rather disappointing results of Olympia and other recent exhibitions were to be expected, according to Mr. Clayden, and the real progress toward satisfactory commercial development will be slow, following a development of the proper personnel.**

By A. Ludlow Clayden

ANYONE who was closely associated with aviation engine work during the war cannot fail to have received a very strong impression from reading the reports of the recent aircraft exhibition in London. An impression that all sorts of things which were threatening to "break" in November, 1918, have since seemingly been forgotten.

In other words, the Olympia show did not disclose those signs of progress which it was reasonable to expect in the light of what was known to be in course of development when the war ended.

What is the explanation? It must be one of two things, either experiment has proved the anticipations of 1918 to be false, or the experimenting then in progress was never carried to conclusion. There is a third possibility, of course, namely, that the British manufacturers did not exhibit their really latest work, but it is not a habit with European concerns to be reticent about their products; on the contrary they are rather more liable to exhibit half-baked designs.

To be a little more specific, the first thing which strikes a man who was in close touch with European experimenting in 1918 is the lack of anything startlingly new in radial air-cooled engines. It is no longer a secret that an engine of this type was expected to be in almost universal employment for British fighting machines had the war gone on till the spring of 1919. Nor is it a secret that the first samples of this engine were failures. But despite those failures the British program in November, 1918, still relied upon the perfection of the air-cooled radial, if not in one form then in another.

This is not said in depreciation of the air-cooled radials which were shown at Olympia, but is merely an expression of surprise that the latter differed so little from their original or 1918 form.

Of course, the probable truth is that the removal of the stimulus of war practically stopped development. This is natural for two reasons: First, the market for new engines, instead of being certain, with peace instantly, became extremely uncertain. Second, the majority of firms and persons engaged on aviation engine work during the war had other interests in peace time, and returned with enthusiasm to such occupations upon the first opportunity.

Aviation motor building is going to be a highly specialized business. The automobile analogy of building a complete machine in one factory where the

highest quality is desired does not apply to aircraft. If we seek a comparison it would be more appropriate to consider shipbuilding, where it is usual for one concern to engine another concern's hulls.

**Furthermore, while development in both aircraft and their engines was immense during the war, there is still an immense deal to be done. The great difference between war needs and peace needs is only just beginning to be appreciated by the user of aircraft, and encouragement from the user is the first essential to activity on the part of the producer.**

There have got to be created manufacturing concerns which will supply the world's future needs in aircraft, and such organizations must be dependent upon a supply of men whose whole experience is in that particular line of endeavor. At the present time there are very few examples of complete specialization of this sort.

The aircraft industry took most of its personnel from the automobile trade, and a majority have returned to their former occupation. There remains a nucleus composed of young men who started with aviation engineering as their first employment after college, and of men from other callings who came over under stress of war and found the fascination of aviation problems great enough to make them want to stay in the new business and help build it up.

All this means that directly the war ended a period of flux set in which has made continued development very difficult. Changes in firms, changes in men, lack of certainty in everything, removal of free government money for experiment and so forth would naturally almost stop development. In Europe it appears to have done so at all events

If so, it is encouraging for America, because it means that in the contest for supremacy in commercial aircraft production America has at least a square start with the rest of the world.

Great pains have been taken to persuade the non-technical citizen that Europe was years ahead of America in aviation work of all kinds. It was true when America first entered the war, but it was not true even at the time of declaring the armistice. Still less is it true to-day.

The essential thing is to get rid of the large scale ideas of war time. Aircraft manufacture is going to be a small business for some years to come; small but ever growing. Where it is impossible to hold together war-time organizations and to maintain war-time productions, it is still possible to pick the best out of the big concern and use it to form the foundation for a new structure. As, for example, the immense Wright-Martin company which, now reconstructed as the Wright Aeronautical Corp., is one of the very few firms in the world making nothing but aviation engines. Consequently, on its reduced scale, it can see ahead the certainty of being fully occupied on a great variety of production and experimental work.

There is not yet room for many specialists, and a majority of the exhibitors at the London show were not specialists, at least so far as concerns the motor exhibits. Of course, branches of huge concerns like Vickers count as specialists, but even then the sum total is not large.

Yet, designing and building aviation engines to-day in the present stage of development of the product, is a full time job for any man or group of men. The automobile engineer of the present era is usually a man who has given all or nearly all his working days to automobile work—a man who has been, so to speak, "born in the industry" and trained to it—and the great strides in automobile design were made by men of this sort; not by those who had turned to automobiles after an earlier career in some other line. It is to be expected that the same will be true of aircraft, that the problems waiting to be solved are going to be tackled most advantageously by the slow building up of the new industry. Did the war really do a great deal more for aviation than just to advertise it?

Look at some of the things we still do not know about aircraft engines, leaving out the ships themselves. For commercial flying we do not know:

**The relative advantages of air and water cooling.**

**The proper balance between engine weight per hp. and engine durability.**

**The advantages of six, eight, twelve and more cylinders in conventional arrangement.**

**The place which the radial cylinder engine will occupy and its importance relative to other types.**

**The difference between the needs of an airplane engine and an engine for dirigibles.**

**Any really good method of automatically compensating for loss of power at high altitude.**

**The relative advantages of very large engines and multiple engine equipment.**

The list could be extended but there is enough work in these seven points to keep all the engineers the aircraft industry can find fully occupied for a goodly space of years.

Topographically the United States ought to be one of the best fields for the use of overland aircraft. It should be far the largest single market and it should therefore be able to support the largest industry. If the law of supply and demand does not fail, then America may reasonably expect to be the largest creator of aircraft engineers and producers.

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# Can Airways Be Made to Pay?

THE problem of aerial transport has hitherto been approached from the standpoint of the man who says, "Here I have got an airplane, how can I utilize it?" *Aeronautics* of London says: The attitude should rather be, "Here I have so much weight to transport from a certain to another place, how can it be done? Can the airplane do it better than any other method? What are its respective advantages or disadvantages as against other means of transport?" It is for this reason that the interviews given by Frank Searle of the Airco Express to the aeronautical correspondent of the *Times* (London) are welcome as showing the light in which an acknowledged

authority on mechanical transport treats these problems.

Mr. Searle's special subject before was the motor-bus, and about the first thing that seems to have impressed him when he began to apply his mind to air transport was the very large proportion of time that the machines were "off the air" compared to the proportion of time that a bus is "off the road." He came to the conclusion that the working hours of the airplane must be increased if the "overhead" charges in running an airway were to be met, and he seems to have succeeded to a great extent in getting this done; in fact, it is stated that each machine on the Airco Service is now doing five times as much work as it used to do when the service was first started.

One point Mr. Searle makes a good deal of is the far better conditions under which a machine is working in the air than it is on the road, but it is scarcely possible to deduce from this that the life of an airplane should be longer than that of a road vehicle. As he says, machines constructed of wood, wire and fabric, as modern airplanes are, could not be expected to survive a day's rough-and-tumble of road transport. Therefore, leaving smashes out of consideration and merely taking a certain proportion of rather heavy landings, it seems doubtful if the present-day airplane can stand up to its work in the way that the road vehicle can.

It is true that the optimist in regard to aircraft can certainly point to individual airplanes that have had a very long life and endured a lot of rough handling. But it is a fact that there are no figures yet existing which can enable one to pronounce a definite opinion on the subject; but one can at least say that the advent of the all-metal machine should be a step in the direction of greater durability.

The same question arises in the case of engines. The aero-engine also works in far better conditions than the road engine with its dust and jars from the road, but, on the other hand, it is of necessity far lighter for the same power. Weight is still a very important consideration in the airplane engine and must be cut down to the minimum consistent with safety. Further, though nowadays it does not have to be run "all out" the whole time as it had to be in the early days of aviation, yet it certainly has to keep hard at it more than the road vehicle. It has no change-speed gears to adjust the speed of the engine to the amount of the load. Here again the future holds out hopes of the multi-engined machine which can afford to rest one or more of its engines during a long journey.

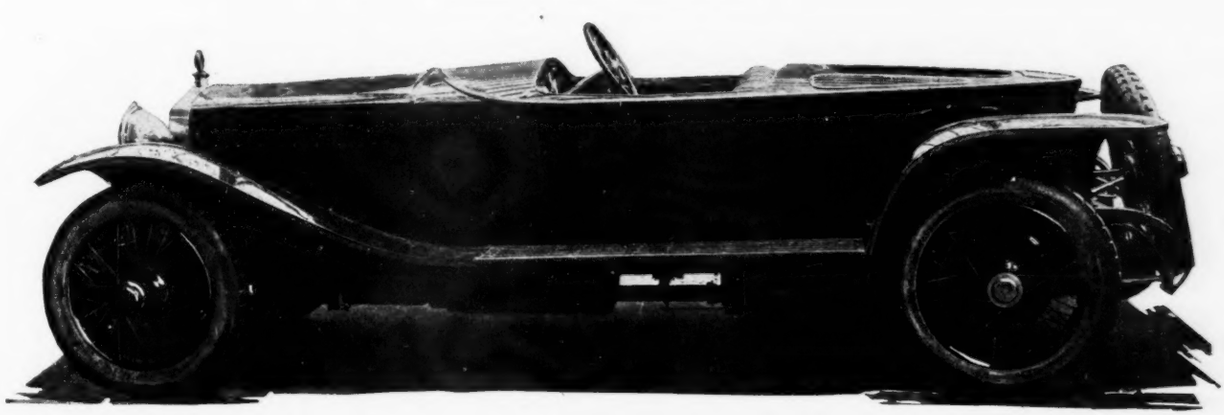
In the case of the single-engined airplane, one of the most important things is the ability to remove one engine and substitute another in the shortest possible time. We have often urged the necessity of this before, but it is a point that has scarcely yet sufficiently received the attention of airplane designers. Yet it must be a very important point in running a successful commercial air service. A reserve of engines is a necessity, and so is the ability to rapidly substitute one in an airplane for an engine that is temporarily *hors de combat.*

Mr. Searle expresses himself in favor of the single-engined airplane, and also of the direct drive between the engine and the propeller, and he attributes a great many of the mechanical breakdowns in aero-engines to the use of gearing. In other words, he is all for simplification. But we have some hesitation in indorsing this. We all agree as to the necessity of doing away with the risk of engine failure, but it is very doubtful if the airplane engine can be sufficiently relied upon at the present time. At any rate, in the larger machine it seems that the multi-engined machine, especially that type where one of the engines can be totally disconnected from the transmission and receive any minor attentions that may be necessary, has very great advantages over the single-engined machine. For the smaller machine the latter type may still hold the field. As regards reduction gear, this has notable aero-dynamical and other advantages, and there is no reason why it should be a cause of breakdowns any more than the transmission or change-speed gear of a car, which is seldom a cause of involuntary stoppage on the road.

We are absolutely with Mr. Searle in his insistence that it is better to sacrifice something in weight-lifting capacity and to put that weight into the engine in order to insure real commercial dependability. Weight per horse-power must be reduced as much as possible, but it must on no account be allowed to interfere with reliability, which must always be the first essential. The aero-engine is now far closer in design to the motor-car engine, and the problem of concentrating greater power without increasing weight and dimensions too much and at the same time insuring reliability is being satisfactorily met.

Mr. Searle also favors the adoption of the monoplane. This is interesting especially in view of the Junker airplane and the Alula wing, but at the same time we take leave to suggest that this is a question which must of necessity be left to the airplane designer.

Yet another point in which we join issue with Mr. Searle is that he says he would be content with a really suitable goods machine, lifting a big load and flying at a slow speed, and that an average speed of 60 or 70 miles an hour would be sufficient. The one advantage of the airplane is speed; it cannot compete in price, and it is handicapped by the fact that airdromes are situated at some distance from the centers of activity. Further, the speed of airplanes is reduced by wind, fog, etc., therefore it is essential that the flying speed of an airplane shall be the utmost possible.



*Sporting type body on Delage six-cylinder chassis*

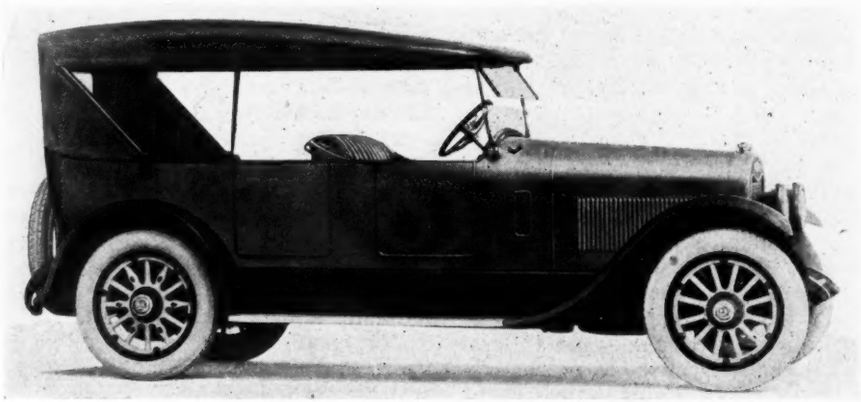
# Lincoln Car Has an Eight-Cylinder, 60 Deg. Vee Engine

**This innovation in design of motor permits use of smaller hood and gives a radial rotating force of constant magnitude instead of a horizontal reciprocating force. In general features, designers appear to have in mind long life of all wearing parts and light weight, as bearing surfaces are large and tubular shafts and hollow members are extensively used.**

By J. Edward Schipper

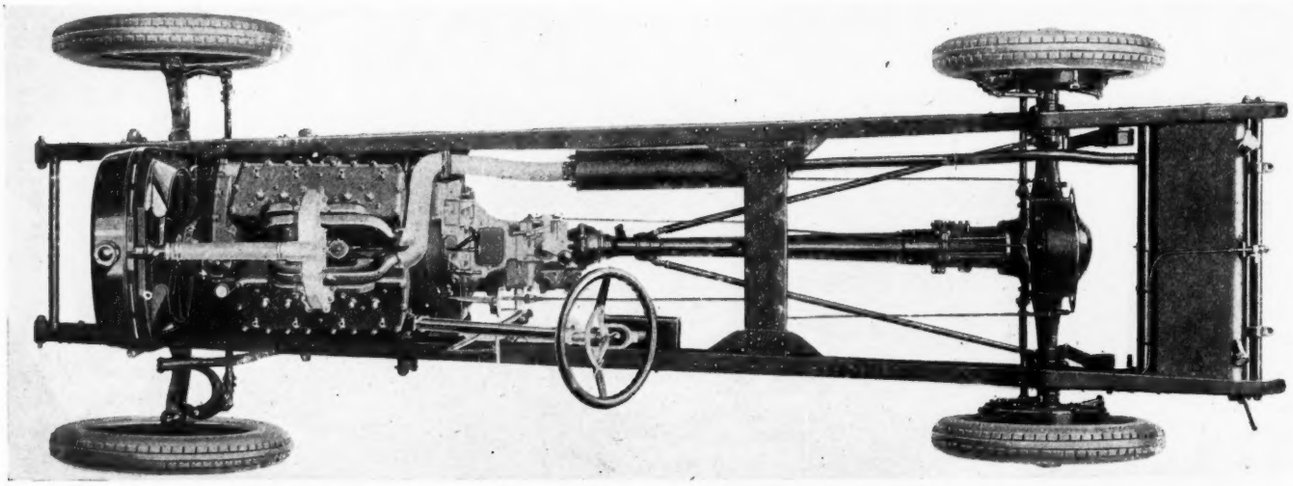
DETAILS have just been announced of the new car of the Lincoln Motors Corp. for which both the trade and the public have been waiting with interest for a considerable time.

As was expected, the new car is of the eight cylinder type, and in design it leans generally toward the conservative, the most striking innovation being the size of the angle of the Vee, which is 60 degrees instead of 90, as commonly used for eight-cylinder engines. This smaller angle makes a narrower engine and therefore permits of the use of a narrower hood. The inertia forces in a 60-degree engine also are of an entirely different character than those in a 90-degree engine, the resultant being a radial rotating force of constant magnitude instead of a horizontal reciprocating force. The radial inertia force in the 60-degree eight is about 40 per cent less than the maximum value of the horizontal reciprocating inertia force in the 90-degree eight. These advantages, however, are bought at the price of an inequality in the intervals between explosions (60 and 120 degrees).

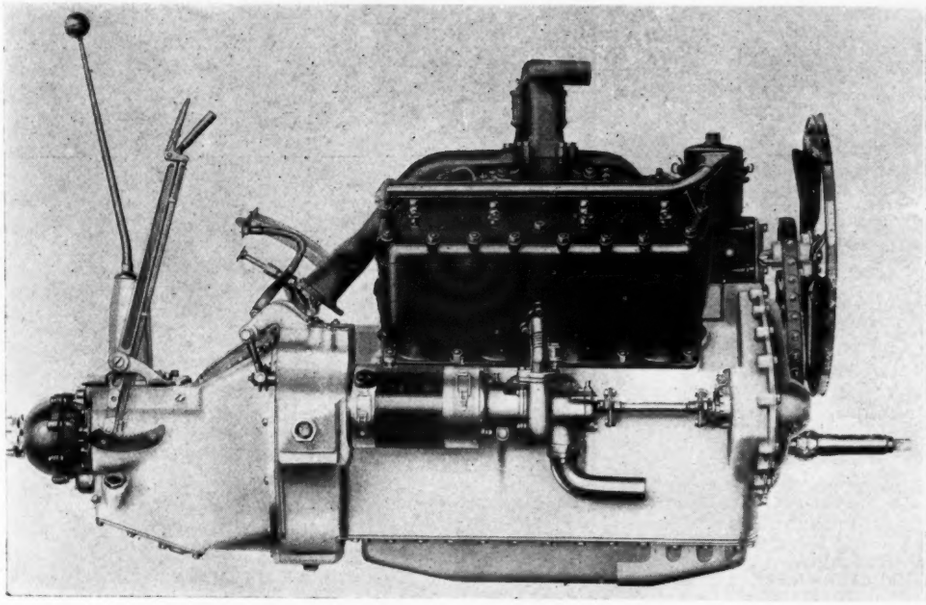


*Lincoln touring car with eight-cylinder 357.8 cu. in. engine*

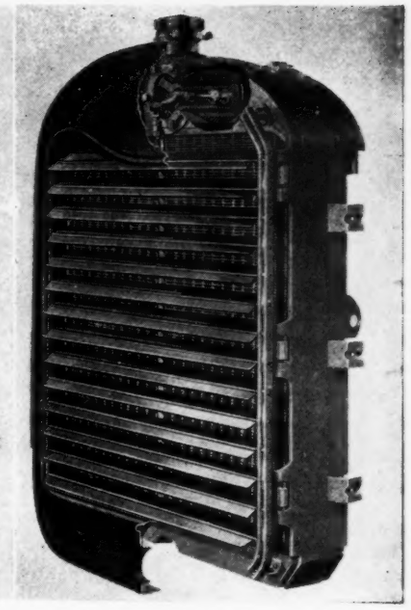
Among the objects aimed at by the Lincoln designers are long life of all wearing parts and light weight. To this end all bearing surfaces are made extra large and tubular shafts and hollow cast members are used. The frame upon which the structure is based is deep sectioned, without offsets in the horizontal plane and is braced by a broad gusseted cross-member near the center of its length, and by tubular



*Plan view of Lincoln chassis, showing cross-bracing of frame and layout of drive members*



*Right side of Lincoln eight-cylinder engine*



*Thermostatic shutter control*

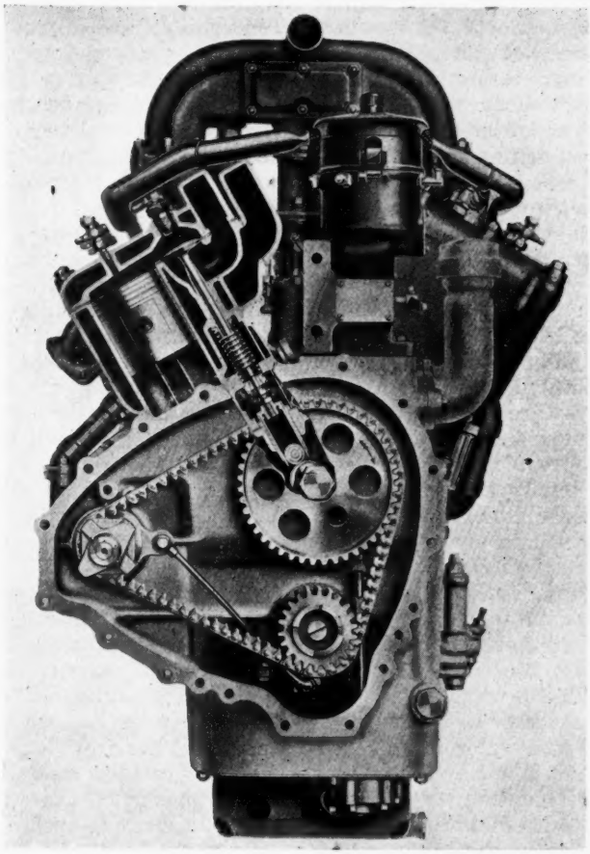
cross-members at the front and rear. The unit power plant, comprising the eight-cylinder, V-type engine and the three-speed transmission, is suspended directly from the main frame by a three-point support.

The engine cylinders are cast in blocks of four, and the two sets of valves make with each other the same angle as the cylinders, namely, 60 degrees. The engine has a piston displacement of 357.8 cu. in., the cylinder dimensions being 3⅜ x 5 in. The engine main structure is composed of the cylinder block casting, a deep, rigid crankcase of aluminum, an aluminum oil pan and the detachable cylinder heads.

The crankcase casting is unusual, because of its depth and because of the fact that it is stiffened by three bridge-like webs acting as supports for the three intermediate main bearings, there being five crankshaft bearings in all. Owing to the depth of the crankcase casting and the use of these partition walls with their stiffening ribs, a very firm supporting structure is built up which has proven a valuable factor in eliminating vibration. The three-point suspension feature is utilized, two supporting members being cast integral with the crankcase, in form of supporting feet on the flywheel housing, while the third suspension member is a universal one, at the timing gear end of the engine.

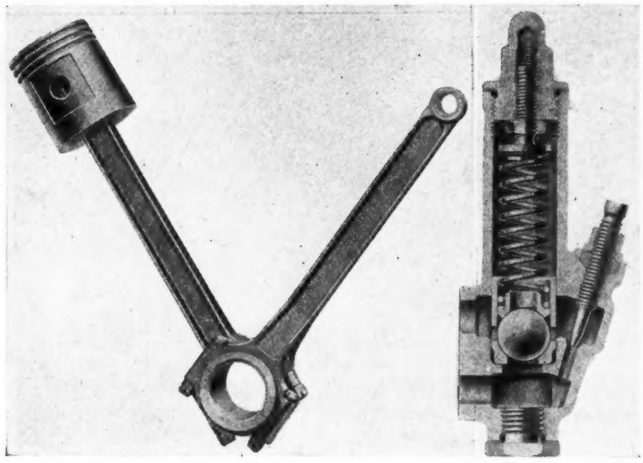
The cylinders are gray iron castings and the heads and cylinder blocks are interchangeable. The pistons are also gray iron castings, 3¾ in. in length, with three piston rings all above the piston pin. The piston pins are ⅞ in. in diameter and are made of seamless steel tubes. The pistons are ground outside of the piston pin boss for relief. The connecting rods are drop-forged I-beams, and are machined all over for lightness. The rods are 12½ in. in length. The crankshaft is 2 in. in diameter of the five-bearing type, the bearings being bronze backed, babbitt lined.

The valve drive is by means of a silent chain with three sprockets. This gives a triangular chain layout, the silent chain passing around the crankshaft, camshaft and pumpshaft gears for the drive. The camshaft is a hollow, drop-forged unit, gun-drilled for its entire length, both for lightness and to permit of positive oil feed to the camshaft bearings. It is mounted in six bronze bearings. The valves are driven directly off the camshaft without the use of intermediate rockers. The hollow tappets have roller followers, the valve location being inside the Vee. The valves are substantially guided, the pressed-in guides extending over approximately 75 per cent of the length of the valve stem. The water jackets almost entirely surround the valve stems, giving a large cooling area at this point.



*Valve drive and section through cylinder*

The engine is lubricated by a pressure-feed system, the oil pump being a gear type driven by helical gears from the camshaft. The oil pump pressure range is from 5 to 25 lb. per sq. in. The oil is pumped past a pressure relief device to the main lead



*Piston and yoked connecting rod assembly*

*Oil pressure relief device*

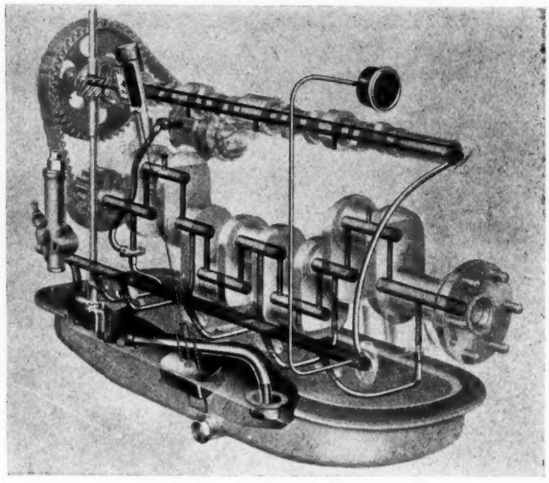


*Diagram of engine oiling system used on Lincoln car*

which traverses the entire length of the crankcase. From this lead the oil is fed to each of the five main crankshaft bearings and then through leads in the drilled crankcheeks and crankpins to the lower connecting rod bearings. Another lead passes from the end of the crankcase lead to the rear end of the camshaft, which is hollow and drilled for lubrication at each of the camshaft bearing points. An independent lead also passes to the timing chain housing, entering it at the pumpshaft sprocket, giving positive lubrication to this drive.

**Lubrication Details**

There is a pressure gage mounted on the dash and also an oil level indicator operated from a float in the crankcase and brought up to a sufficient height to be readily legible on lifting the engine hood. The flow through the bearings is regulated by a ball pressure relief valve which is mounted on the front end of the crankcase and is readily accessible for adjustment. The ball check is spring controlled, adjustment of the pressure relief being effected by increasing or decreasing the pressure on the springs by turning the adjusting screw.

The cooling system has a capacity of 8 gal., the water being circulated by a centrifugal pump mounted on the right side of the crankcase. Water is equally distributed to both cylinder blocks, the two streams uniting and returning to the radiator through the gas intake header, which comprises three passages. The middle passage is the intake to the cylinder, the outer is for the water return and the inner one is connected direct with each exhaust manifold. The intake gases are thus heated both from the exhaust water and the exhaust gas.

The radiator is a tubular type provided with shutters. The core is separated from the outer casing by an air space to preserve the finish of the radiator. The shutters are controlled by a thermostat which is mounted in the upper radiator tank and which directly actuates the shutter mechanism. The thermostat is a syphon type, horizontally mounted, and directly linked to a vertical rod passing down the center of the radiator and connecting the shutters, which rotate on rods piloted in the supports at the side of the radiator. Thus, the shutters respond immediately to changes in temperature of the water passing through the cooling system. The water in this system circulates freely at all times and is not by-passed, but passes directly through the radiator, the temperature being controlled by the shutters. There is a condenser tank in connection with the radiator overflow pipe, which prevents loss of cooling liquid by evaporation. Upon cooling of the radiator, the condenser liquid is drawn back, this being a particularly valuable point when using alcohol or other expensive anti-freeze solutions.

The fan is a six-blade, ball bearing type, mounted on an adjustable bracket. It is driven by a link belt from the fan pulley which is mounted on the end of the camshaft. The electrical system is a Delco installation, the starter-generator being driven off the pumpshaft. The distributor is mounted at the front end of the engine crankcase, and comprises an automatic spark advance, with manual control for extreme speed regulation. The starter-generator is a 6-volt, single unit, with mechanically operated gear drive to the flywheel for cranking. The current is regulated by the third brush system, and ground return wiring is used. The headlights are equipped with tilting reflectors controlled from the driver's seat. Circuit breakers are employed instead of fuses.

The clutch is a dry plate type with fifteen disks, seven driving and eight driven. It is externally adjustable for wear and is completely enclosed within an aluminum alloy housing which forms a continuation of the crankcase, making up the unit powerplant. Alternate disks are faced with asbestos woven fabric. The transmission gearset is a three-speed, selective type, the main shaft being mounted on annular ball bearings of large diameter. The gearbox is of conventional design with exceptionally short, stiff shafts, the sliding gears being mounted on splines. The universal joint at the front end of the propeller shaft is in communication with the gearbox, thus assuring lubrication for this important member. The torque tube takes all of the driving thrust which is transmitted through this ball joint. Increased rigidity in the driving unit is secured by a triangular radius rod layout connecting the outer ends of the rear axle housing with the torque tube at a point just behind the ball joint.

**Spiral Bevel Rear Drive**

The rear axle is a spiral bevel design, mounted throughout on Timken roller bearings. The pinion shaft is carried in an adjustable carrier which permits of adjustment of the mesh between the pinion and ring gear. The ring gear is also adjustable for mesh. The axle is a full floating type with the weight carried on the pressed steel housing. The front axle is a drop-forged I-beam, and the frame is pressed steel, channel section, 7½ in. in depth. The frame is of the straight tapered type, and is narrowed in front to such an extent that the car can turn in approximately 43 ft. The springs are semi-elliptic, of chrome vanadium steel, the rear springs underslung and

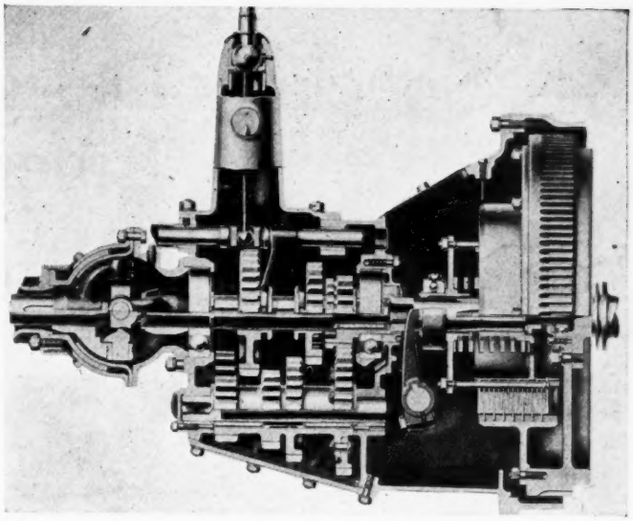
carried on oscillating spring seats. The spring bolts are of exceptional size, being 1 in. in diameter, hardened and ground. The spring eyes have extra hard bronze bearings, the entire chassis lubrication being taken care of by the Alemite pressure lubricating system. The wheels are mounted on roller bearings and have twelve spokes, both front and rear. The wheelbase is 130 in. for all cars except the suburban limousine, which is 136 in.

### Vacuum Fuel Feed

The gasoline tank is supported from the frame members at the rear by a three-point suspension system and has a capacity of 20 gal., including reserve. Fuel is supplied to the carbureter by the Stewart vacuum system. The steering gear is of the worm and sector type. The speedometer is driven from the propeller shaft through helical gears which are automatically lubricated from the universal joints. The power pressure pump is driven from the transmission. The tire size is 33 by 5 in., cord tires being standard equipment. The chassis presents a very accessible layout, grease cups having been abandoned in favor of the Alemite system, and the brake and other adjustments are easily made. The clutch pedal is adjustable by taking up on an easily accessible screw closely adjacent to the pedal mounting. The adjustment is made by regulating the length of the links between the clutch pedal and the clutch lever.

Eight bodies are supplied on the car, these being straight line types without radical innovations in lines. The bodies and prices are as follows: Touring car, seven-passenger, $4600; Phaeton, five-passenger, $4600; Roadster, three-passenger, $4600; Coupé, four-passenger, $5750; Town brougham, five-passenger, $6250; Sedan, five-passenger, $6000; Suburban limousine, seven-passenger, $6600; Town car, seven-passenger, $6600; Chassis, $4000. These prices are f.o.b. Detroit. The standard finish of the body panels is very dark blue, almost a blue black, which the company calls Lincoln blue. A belt line stripe is used to match the interior finish. The running gear, radiator, hood, fenders, etc., are black enamel. The wheels are finished in Lincoln blue with striping to match the interior finish.

The interior work on the car is carried out very tastefully, an example being the instrument board, which is balanced, having the speedometer and clock layout similar

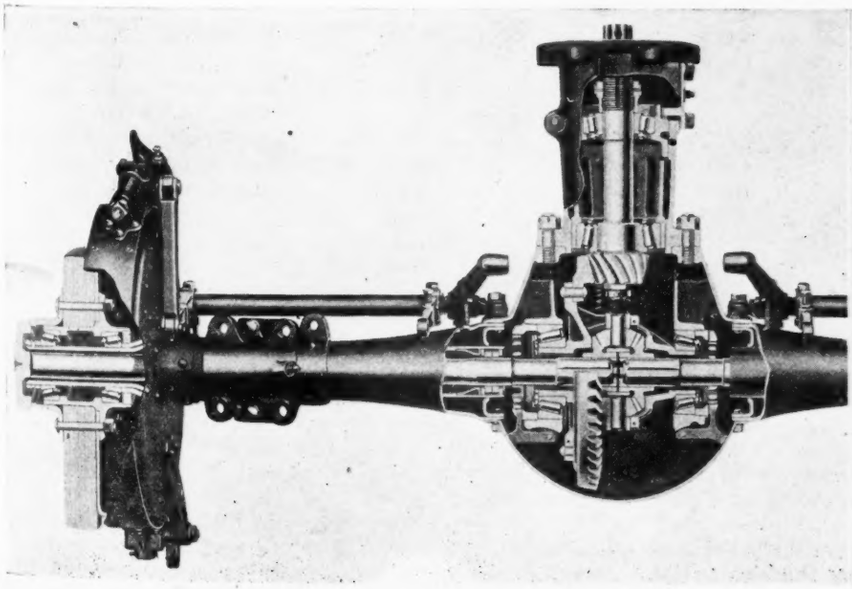


*Section through clutch and transmission*

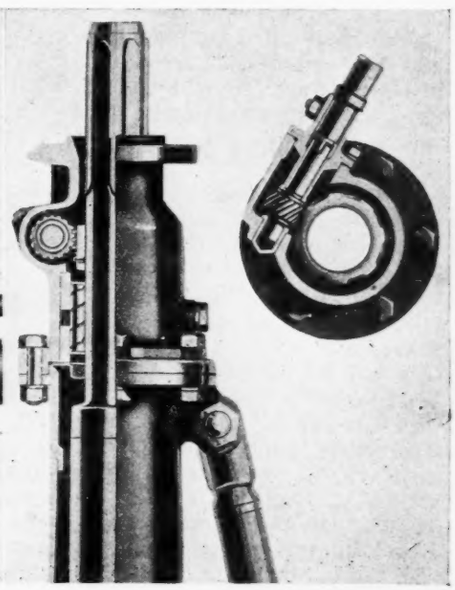
in size to the switch layout. Between these two are mounted the oil pressure gage and ammeter, so as to give a symmetrical appearance to the dash. The cars are now coming through in regular production, several hundred probably will be made in September, although no regular schedule has been announced. Originally, it was intended to build 6000 of these cars this year, but delays, due to freight and material conditions, have made it necessary to revise this schedule.

### Road Performance

The writer, on a trial ride over the roads adjacent to Detroit, found a very unusual range of performance. The speed extremes on high gear were 3 and 73 miles per hour over concrete road and the car developed in excess of 60 miles per hour over badly rutted and worn road. The riding qualities were such as to show a very finely balanced product. No noticeable period could be found in the engine from its lowest to its maximum speed. The particular car in which the demonstration trip was made was geared 49 to 12. It had its thermostat set to keep the water outlet temperature at 150 degrees.



*Partially cutaway view of spiral bevel type rear axle*



*Torque tube, radius rod and speedometer drive*

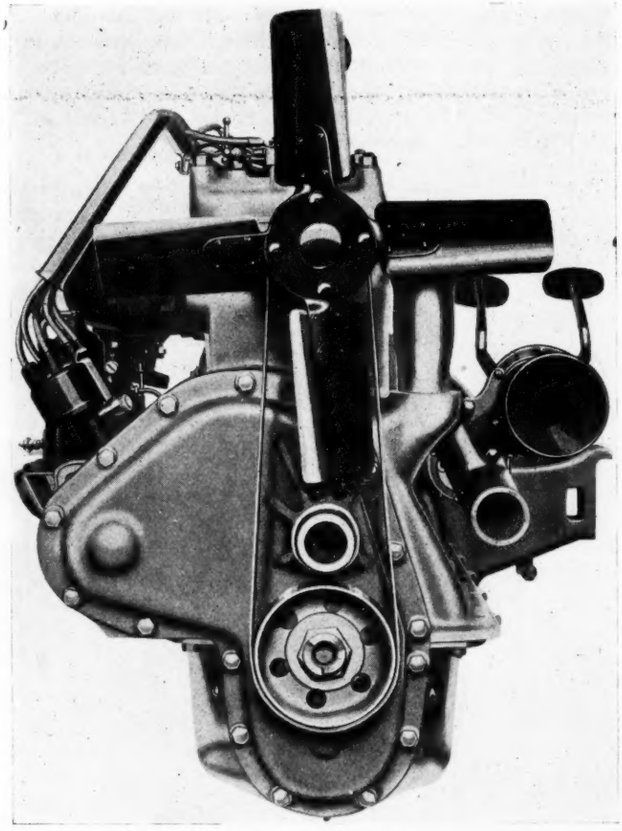
# A Specially Designed Engine for the Liberty Car

**The factory problem in this case has been solved by a design that can be manufactured in an existing engine plant. It is a 6-cylinder block type, 3⅛ in. bore and 5 in. stroke. Cylinder heads are cast in pairs and the three identical head castings are then bolted to the same cylinder block.**

By P. M. Heldt

IN the past, the Liberty Motor Car Co. has been using the Continental engine, but this year the firm makes use of its own engine, which is being built for it by the Wisconsin Motor Mfg. Co. This is not a case of a motor manufacturer's design being slightly altered to suit a particular client's need, but the engine was specially designed from the ground up, and is the only passenger car engine at present being manufactured at the Wisconsin company's plant. In the design, the engineers of the Liberty company co-operated with the engineers of the motor manufacturing company to adapt the engine, as far as possible, to the manufacturing equipment at hand.

Briefly, the engine is a six-cylinder block type, of 3⅛ in. bore by 5 in. stroke, with the top half of the crankcase cast integral with the cylinders and the bottom half made of a steel pressing. The piston displacement is 230.1 cu. in. and the compression volume is 21.5 per cent of the total combustion chamber volume at the beginning of the compression stroke.



*Front view of Liberty engine*

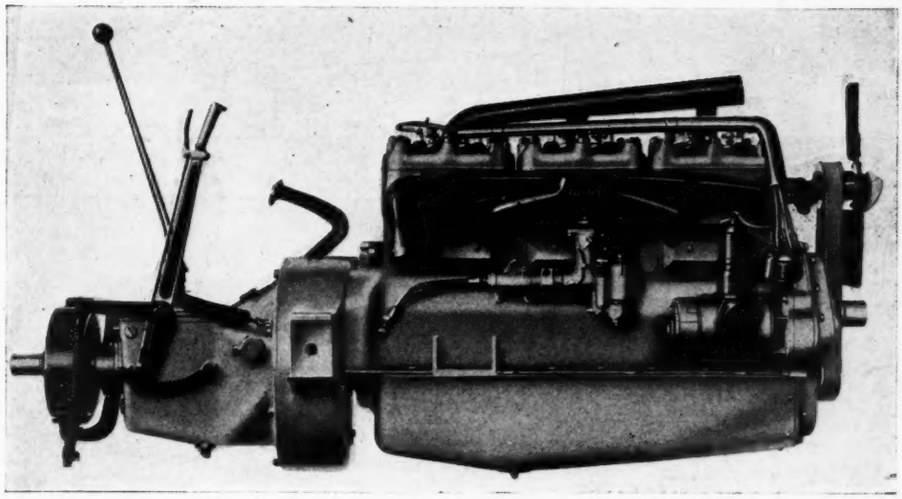
One point in respect to which the engine differs from most other designs is that the cylinder heads are cast in pairs. Each engine, therefore, is provided with three identical head castings, all bolted to the same cylinder block. The object aimed at in this feature is to get all of the combustion chambers as nearly alike in volume as possible. It will readily be understood that if all of the heads were in a single casting, and there was some inaccuracy in the molding or in the pattern, it would be impossible to do anything to overcome this inaccuracy. With the Liberty engine, the head casting, containing the combustion chambers of two adjacent cylinders, is located for the first machine operation from the inside surfaces of the two compression chambers. The bosses on top are then milled off, which are all at the same level, after which the casting is turned over on the bosses and milled off on the lower side. This method of handling the machining work naturally insures very close uniformity in the cubical contents of the compression chambers, and hence in the compression pressures in the different cylinders.

The side walls of the upper half of the crankcase are virtually extensions of the water jacket and of the valve chamber, there being no "waisting" effect at the bottom of the water jacket. As a matter of fact, the water jacket extends practically all the way down the cylinder barrel, as may be seen from the sectional view.

The joint between the top half and the lower half of the crankcase is in a horizontal plane through the crankshaft axis. The flywheel housing or bell housing is a separate casting which is bolted to the rear end of the cylinder block, as clearly shown in the longitudinal section. The whole bell housing is cast in a single piece, and in order to be able to get the crankshaft with its integral flange for the flywheel into place, there is a large opening cast in the side of the bell housing toward the engine. That portion of this opening not filled by the crankshaft and its bearing cap when in place is later closed by a sheet metal plate held on by cap screws. There are three hand holes, giving access to the valve mechanism, and these are closed by pressed steel cover plates, held on by two studs and nuts each. The pistons are made of gray iron, with a very thin skirt below the ring belt and are provided with three compression rings at the upper end. The pistons are relieved eccentrically over the ends of the piston pins. An oil groove is cut

in the piston at the bottom of the lower ring groove, with six small holes through which any excess oil can return to the crank chamber. The piston pins, which are hollow, are closely fitted in the piston bosses and are held from drifting by means of two snap springs in the piston bosses at the ends of the pin.

Connecting rods are of standard I section and the caps are held on by two bolts with laminated shims between rod and cap for purposes of adjustment. The white metal is cast right into the rod end and the cap, under a pressure of 600 lb. per sq. in. In order to secure a good anchorage for the lining, six anchor holes are drilled in each half. Both the main bearings and the camshaft bearings are of the bronze back, babbitt lined type. After the main and camshaft bearings are inserted in the cylinder casting, the latter is put into a fixture for finishing the bearing shells. A cut is taken out by means of a cutter bar with a single point tool, and then a Martell reamer is run through for sizing, taking out from 0.002 to 0.003 in. Cast iron caps are used for the main bearings, each held on by four studs and nuts.

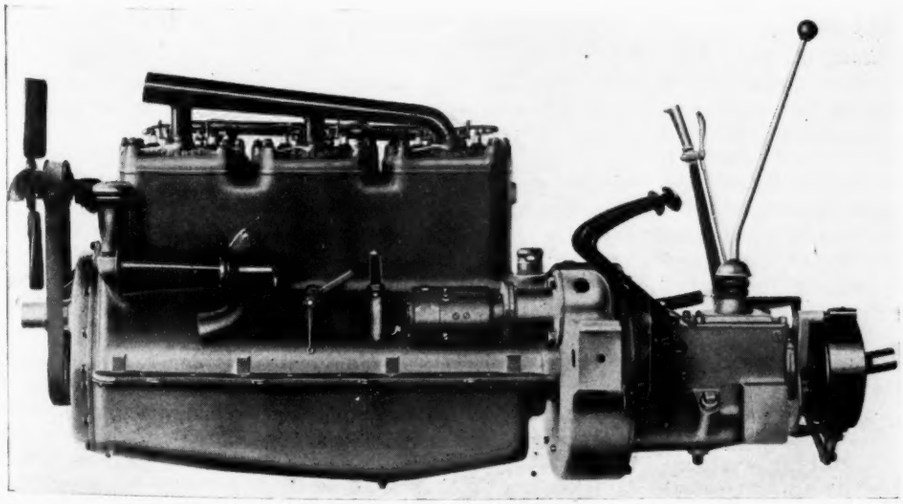


*Right side view of powerplant, showing carbureter and manifolds, generator and ignition equipment*

The crankshaft is supported in four main bearings. The diameters of the bearings increase in steps of 1/32 in. from front to rear, this feature being adopted in order to facilitate machining. It allows of inserting a cutter bar with four cutters, and starting operation on all four bearings at the same time. The dimensions of the main bearings (front to rear) are as follows: 2 x 2½ in., 2 1/32 x 1⅞ in., 2 1/16 x 2 in., 2 3/32 x 3 in. The crankpin bearings are 2 in. in diameter by 1⅞ in. in width. All end thrust is taken up on the front bearing, the bronze bushing of which is provided with liberal flanges, whereas clearances are provided between the crankarms and all of the other bearings. Shims are provided back of the crankshaft pinion to take up the wear on the thrust bearing. Of the cam gears, the smaller ones are made of steel and the larger of cast iron, and all are cut with helical teeth. The oil pump, which is of the gear type, is bolted to the front crankshaft bearing cap, and is driven from the crankshaft pinion by a narrow faced gear meshing with same. The pump runs at a slightly higher speed than the crankshaft, and its two gears are made of steel and bronze respectively.

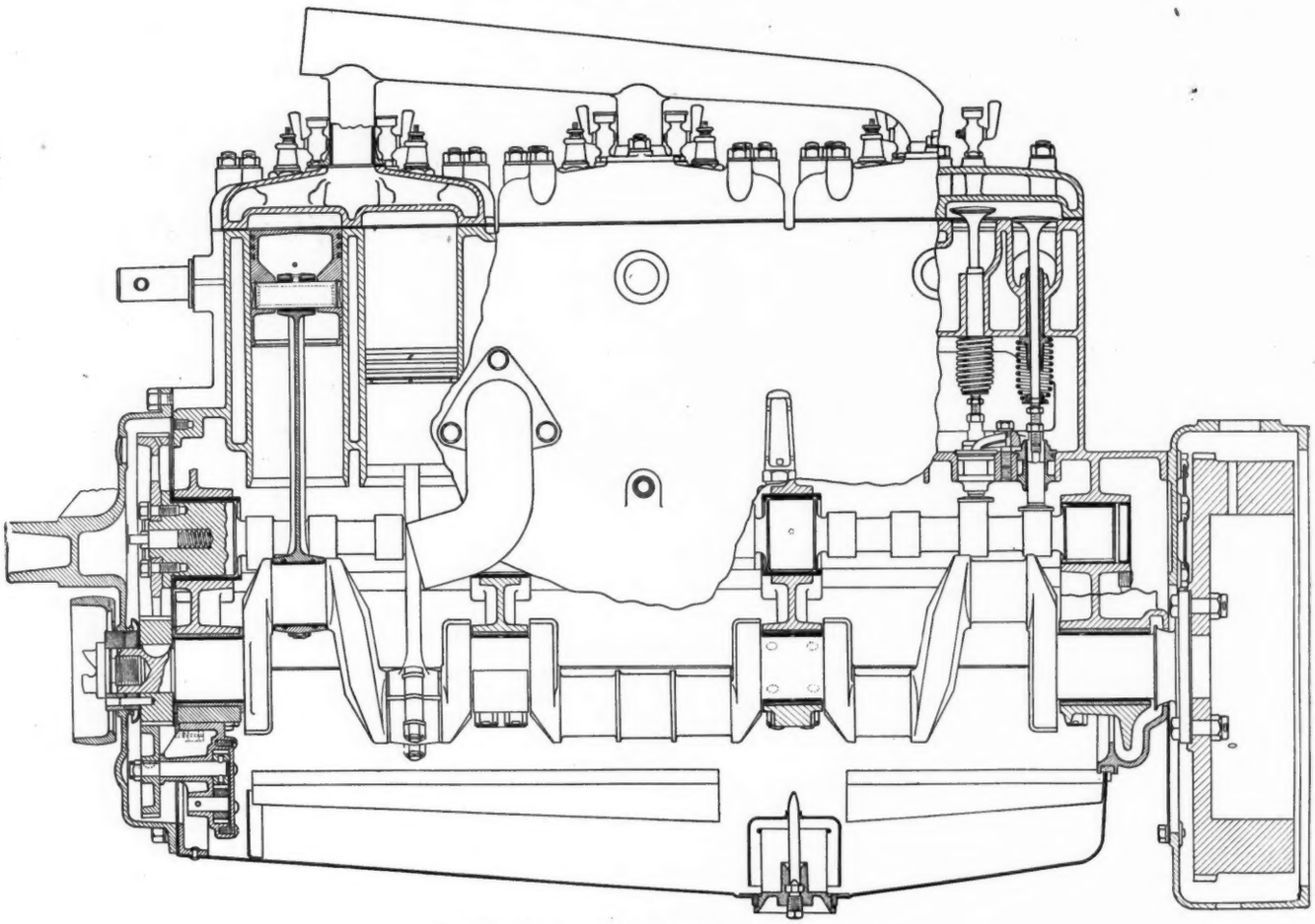
The camshaft is supported in four large diameter bearings, and these are stepped, the same as the crankshaft bearings, and for the same purpose. The front bearing is 2 7/16 in. in diameter, the first intermediate 2⅜ in., the second intermediate 2 5/16 in., and the rear 1¾ in. The camshaft driving gear is bolted to an integral flange with 4 bolts.

As already pointed out, the oil pan is made of pressed steel and is provided with filler plates to prevent splashing of the oil in the case. A ⅛-in. reinforcing strip is welded to the flange of the pan all around. Oil is fed under pressure to all of the main bearings and through oil passages drilled in the crankshaft to the crankpin bearings. The suction tube of the pump is fastened to the lower face of the crankcase upper half and extends from the pump back to the rear center bearing and thence down into the oil sump. Here the pipe has the screen cover soldered to it. The screen itself is fastened to a plug in the sump which can be removed for cleaning purposes. This screen is open on top, the screen cover not coming quite down upon it, and if the operator should neglect to clean the screen, the oil would be drawn through the open top, and still keep on circulating, but it would not be filtered.



*Left side view of powerplant, showing oil filler, electric horn, oil gage, starting motor and control pedals*

The main oil header is a steel tube which is inserted into drilled bosses under the camshaft bearings. These bosses are drilled by means of a jig, having a guide for the drill in front of each boss, which latter is about 1¼ in. thick. After this main header is inserted, distributing passages are drilled in the partition walls leading from the main bearing hub up to the main header. A circumferential oil groove is cut in the bushing at each end of each camshaft bearing, and in addition there is a longitudinal groove connecting the two circumferential grooves at the bottom, which carries the oil across the



*Longitudinal section through Liberty engine*

bearing. A plug is screwed into the front end of the oil distributing header, with a 1/16 in. hole in it, through which a stream of oil is thrown onto the timing gears. An S. A. E. pipe fitting is screwed into the front boss supporting the oil header, and from it a short length of copper tube connects to the pump.

In order to prevent over-oiling when the engine is idling or running under small load at considerable speed, the oil pressure relief valve is interconnected with the throttle. An oil lead is taken off the main header at the rear intermediate bearing. Outside of the crankcase at this point—there is a Tee fitting, one lead from which runs to the oil pressure gage on the intermediate bearing on the carbureter side. The pressure relief valve is controlled by a spring, which is so arranged that when the engine is idling the pressure is kept down to between 2 and 3 lb. per sq. in. From the illustration it will be seen that the spring of the relief valve is supported by a slidable cup, against the base of which bears a cam connected to the carbureter lever arm. At full throttle it takes a pressure of about 13 lb. per sq. in. to open the relief valve, and this is the pressure at which oil will then be distributed to the bearings.

There are two breathers on the crankcase, located at the extreme ends. The forward one of these also serves as an oil filler. An oil gage of the float type is also provided. The stem of the float passes through a guide screwed into the bottom flange of the upper half of the crankcase, and a knob at the top of the stem, together with high level and low level marks on the frame, indicates the amount of oil in the crankchamber. The cover of the breathers is held in place by wedge action and does not have to be unscrewed. A "control tube" through which shafts for both the spark and throttle control extend is set into the upper part of the crankcase, as both the carbureter and ignition unit are mounted on the right hand side and the car has left hand drive.

Valves of 1½-in. clear diameter, with 5/16-in. lift, are used. Separate valve stem guides of cast iron are forced into the cylinder blocks from below. The timing of the valves is as follows:

Inlet opens 8 deg. past dead center.
Inlet closes 40 deg. past dead center.
Exhaust opens 45 deg. ahead of dead center.
Exhaust closes 6 deg. past dead center.

The cam followers are of the mushroom type, and the pushrods are mounted in cast iron guides which are held down by yokes two and two together.

Cooling water is circulated by thermosyphon action. As already pointed out, the water jackets extend nearly all the way down the cylinder barrels and they are of liberal size. A fan stud is screwed into the cylinder block at the forward end. Water enters the jacket space through an elbow casting between the second and third cylinders at the bottom, and may be drained off through the elbow. The entire system can be drained by means of a pet cock at the bottom of the radiator. In order to insure good circulation all around the valves and to every portion of the water jacket, a large number of small openings, rather than a small number of large ones, are provided in the cylinder head gasket. The outlet from the water jacket is from the highest point of each cylinder head casting, the heads tapering up in all directions. The spark plug holes are located centrally on the compression chambers, between the valves and just outside of the edge of the

cylinder bore. Water passes all around these bosses, and the spark plugs, therefore, are effectively cooled.

The generator bolts on to the back of the cam gear housing, the driving gear being mounted directly on the armature shaft. The mounting used is that known as the S. A. E. Standard flange mounting. The starter is located on the opposite side of the engine, and also has a flange mounting. It is provided with a Bendix drive.

Three point support is provided for in the design of the engine, two supporting arms being cast integral with the bell housing, and a trunnion being cast integral with the timing gear housing cover plate. Owing to the fact that the belt pulley for the fan drive is mounted on the forward end of the crankshaft, this trunnion is not concentric with the crankshaft, but located above it, at such a distance as to clear the belt pulley. This trunnion extends forward so that the front engine bearer will clear the fan belt, and the trunnion is suitably stiffened by numerous ribs. End thrust on the camshaft, due to the helical gear drive, is taken upon a spring plunger bearing against a hardened thrust plate on the gear cover.

An exhaust heated type of manifold is used. As will be seen by reference to the illustration, the exhaust manifold is nearest to the engine and the intake manifold is bolted to the outside of the exhaust manifold. There is a small exhaust jacket on the inlet manifold at the center of the engine, where the exhaust gas encircles the inlet manifold three-fourths of the way. Then, where the inlet manifold joins to the exhaust manifold, the gases pass through hollow ears cast on the exhaust manifold, and are there further heated. This makes a neat and simple construction. Copper asbestos gaskets are used for the joints between the manifolds and the engine.

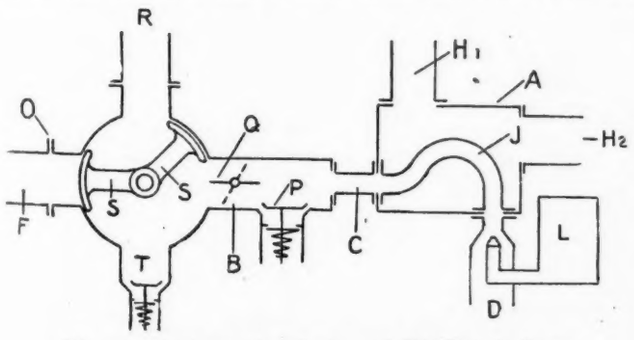
The fan pulley on the crankshaft, already referred to, is designed for a 1¼-in. flat belt. A swinging arm is mounted upon the fan stud screwed into the front end of the cylinder block. A hole is drilled through the fan stud transverse to its axis, for the purpose of inserting a tool for screwing it into place.

The rear main bearing cap is cast with a ring in which there is a packing groove which is partly filled with a cork packing for insuring an oil tight joint with the lower, pressed steel half of the crankchamber. At the end of the bearing is formed the usual groove for the knife edge oil guard on the crankshaft. The return passage for the oil from this guard groove to the oil sump is formed in the bearing cap, and is in the form of a "U" shaped passage. The bottom of this passage is always filled with oil, and hence there is an oil seal which tends to prevent loss of oil from the crankchamber through the rear bearing.

The flywheel is an iron casting and is cut with the toothed ring for electric starter. Weight of complete engine, without carbureter and electrical equipment, is 500 lb.

# A New Kerosene Carbureter

WHILE kerosene has been extensively used as a fuel on motor boats and for motor tractors, it is seldom employed for passenger cars, for the reason that the load on the passenger automobile varies a great deal, and this makes it difficult to properly vaporize the kerosene and distribute the charge under all conditions. A kerosene carbureter which is said to have given satisfactory results in automobile service, has been invented by C. F. G. Kjellberg, a Swedish engineer. Mr. Kjellberg began his experiments in the use of kerosene as far back as 1906, when he installed a Thornycroft motor in a boat. He then observed that when kerosene is once thoroughly vaporized, it can remain in contact with cold air for a long time without condensing. The new carbureter is based on this principle.



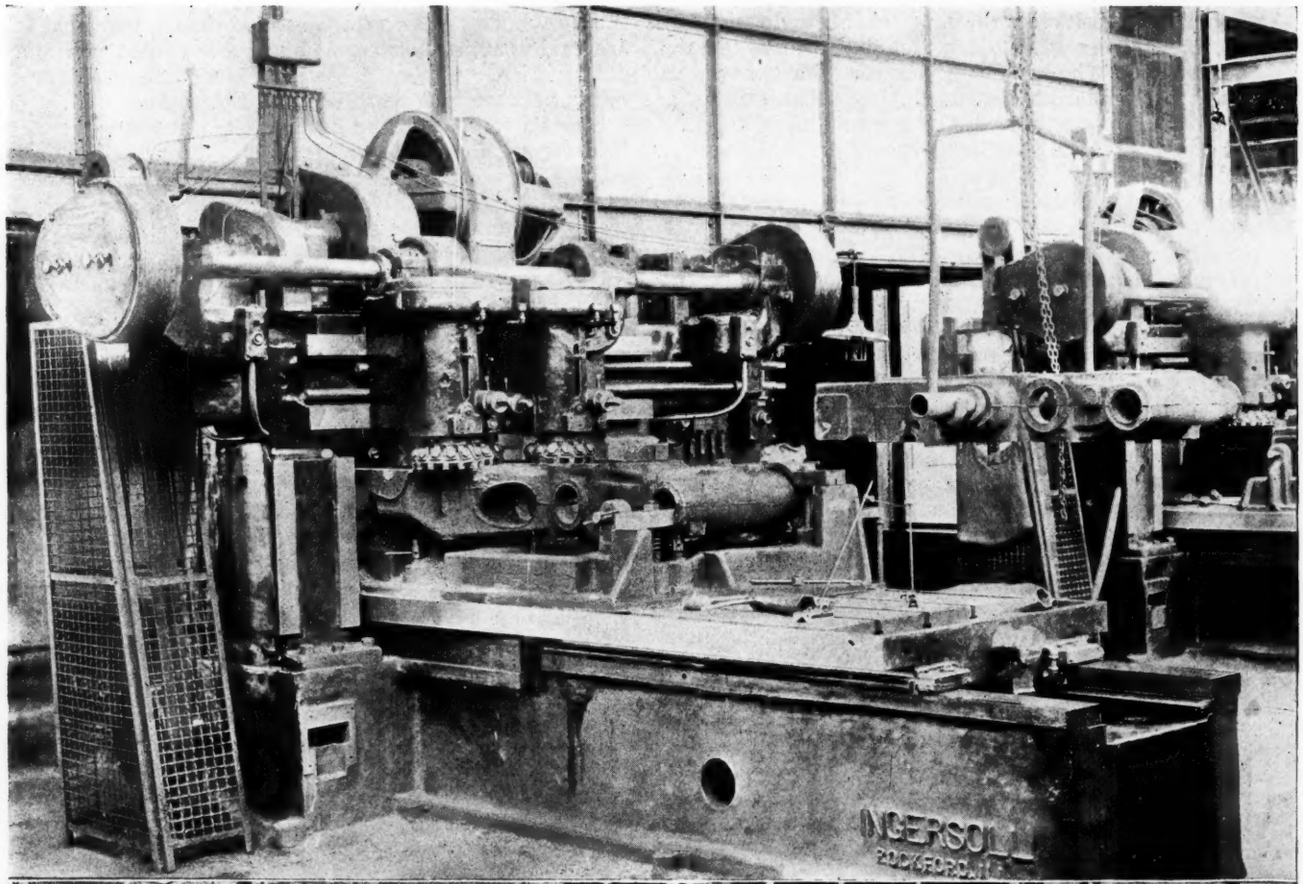

*Diagrammatic sectional view of Kjellberg's kerosene carbureter. Key: A, exhaust heater; B, mixing chamber; C, connecting pipe; D, main air inlet to kerosene carbureter; F, gasoline carbureter; $H_1$, $H_2$, exhaust inlet and outlet of heater; J, heater tube of copper; L, float chamber; O, flange connection of gasoline carbureter; P, air valve supplying additional air to fuel mixture after it has passed through the heater; Q, throttle valve; T, supplementary air valve serving to maintain mixture proportion constant; S, S, fuel change-over valve; R, inlet manifold*

There are two characteristic features to the Kjellberg carbureter. The kerosene, in the first place, is mixed with only a portion of the air required for combustion and the mixture is then heated by exhaust heat. Further on toward the inlet valves the extra air is added. Then, a separate gasoline carbureter is used for starting and the gasoline and kerosene carbureters are connected to opposite sides of a T in which there is a "change-over" valve.

The carbureter comprises a heater A in the form of a cast iron chamber connected between the motor and the exhaust pipe. Inside the heating chamber there is a copper pipe with two bends, which is secured at one end to the venturi outlet and at the other to the mixing chamber through a short length of flanged pipe. The kerosene nozzle is secured to the float chamber which is provided with a strainer pipe for the kerosene and an air intake pipe.

The mixing chamber is connected to the inlet pipe R. On the opposite side from the mixing chamber is mounted an ordinary gasoline carbureter. This gasoline carbureter, therefore, occupies approximately the same position as one secured directly to the inlet pipe, only that it is a little lower. The mixing chamber is also provided with an automatic valve P for supplementary air, a barrel type throttle valve B for the gas, the change-over valve S for changing from one fuel to the other, and a small valve T for external air.

The barrel valve for changing from one fuel to another permits of running either on gasoline or kerosene. When the kerosene carbureter is in use, some air enters the intake pipe through the air inlet adjacent to the kerosene float chamber and passes with kerosene from the spray nozzle through the hot pipe and through the connecting pipe to the mixing chamber, where air is added by the automatic valve. Then the mixture passes through the throttle into the change-over valve chamber, where the extra air is added by the small valve T, and thence up the inlet pipe to the cylinders.



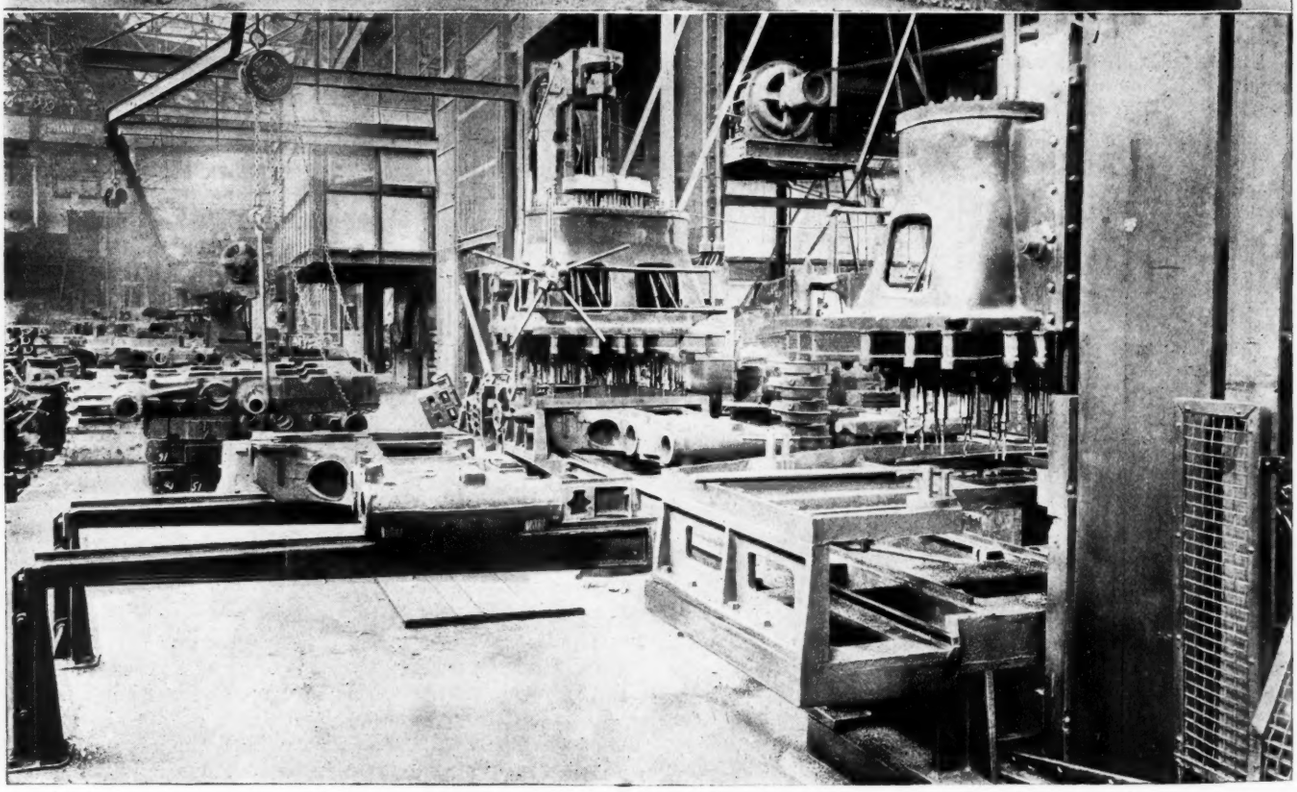



*Fig. 1 (top picture)—Facing top of unit frame in Ingersoll continuous milling machine*
*Fig. 2 (bottom picture)—Two multi-spindle Natco drills with fixed jigs set opposite each other, for drilling holes in top of casting*

# Case Designs Production Machines for Unit Frames

**To machine the casting which serves as frame, bottom half of engine crankcase, bottom half of transmission case and the rear axle housing, two machines were developed which, in connection with standard machine tools, do the work with extreme accuracy and cut down labor cost.**

By P. M. Heldt

THE outstanding feature of the Case line of farm tractors is the "unit" frame casting which also serves as the bottom half of the engine crankcase, the bottom half of the transmission case and the rear axle housing. Naturally, this is a rather complicated piece and requires a large amount of machine work to be done upon it. The piece is, moreover, of such shape that it cannot be advantageously handled in standard machine tools. This led the J. I. Case T. M. Co. to design and build a number of special machines to perform the major operations. These are multi-tool, hydraulic feed machines and permit of rapid production with a minimum of labor cost.

The Case company has been kind enough to furnish us with a number of drawings of these tools, and these, together with the photographs and the description, will serve to make the design and operation of the machines clear. In the following article the successive operations on the unit frame from the foundry to the paint shop will be described in consecutive order.

The casting is made in cast iron flasks, which are specially designed. These flasks are ribbed to be light and strong, and are provided with trunnions under which chains can be attached. The half pattern is fast upon the molding plate and the flasks are locked to the plate by means of wedges. Sand is compacted in the molding machine by means of a bumper, so as to minimize the amount of hand-ramming required. After the ramming has been completed, the flask is turned upside down on its trunnions while hanging from the hoist. To take out the pattern, the wedges are removed and an air hose is connected, whereupon the cope or cover plate with the pattern is vibrated by an air hammer and the pattern is raised by turning a hand-crank which forces four jack screws through the cover. After the pattern has been thus loosened from the sand, it is lifted right out by means of an electric hoist. Then the two halves of the flask are put together and the casting is poured.

When the castings have cooled they are removed from the flasks and are transferred to the cleaning room, where all cores are knocked out and the casting is chipped, sand blasted and inspected; it is then sent to the rough stock department.

The first machine operation on the casting consists in milling the top and bottom faces in an Ingersoll continuous milling machine provided with a special head. The operation on the top face includes the milling of the flanges for the engine and transmission housings, while the milling on the bottom is for the flange of the oil pan. The operation on the top face requires eighteen minutes, and that on the bottom face fifteen minutes. This milling operation is illustrated in Fig. 1. One of the castings is shown in the milling machine while another one hangs from a hoist, showing the method of handling the heavy castings.

The holes in the top of the casting are drilled in two Natco multi-spindle drills which are set opposite each

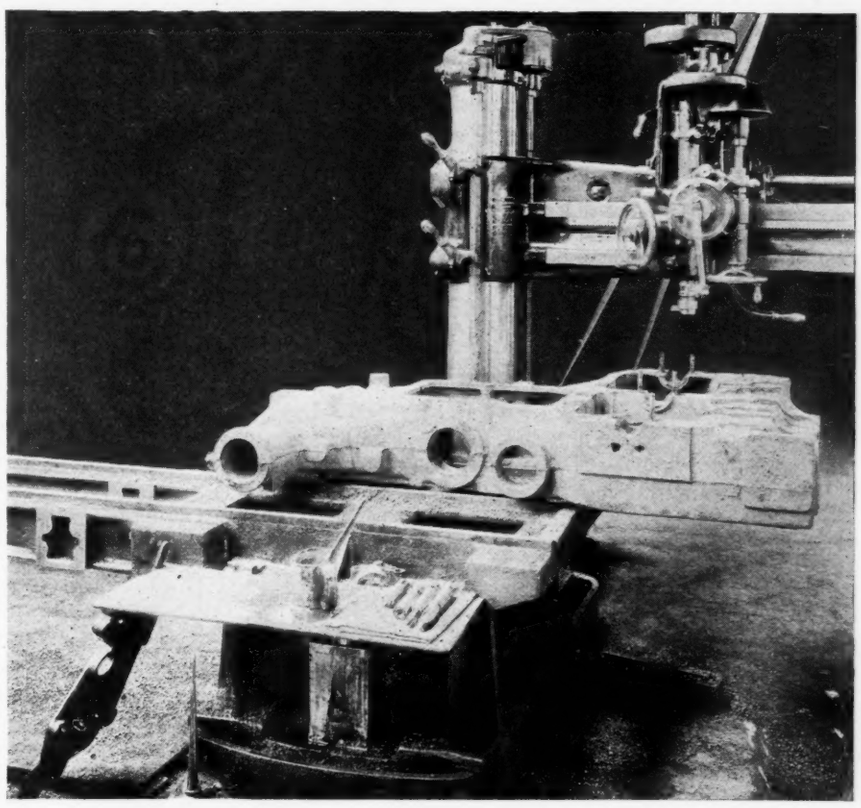


*Fig. 3—Drilling and tapping for, and inserting main bearing studs. (Note tools in foreground)*

other (Fig. 2) with a track between them by means of which the casting can be slid from one drill to the other without lifting it. The jigs used for drilling remain in position on the tables of the drills. In the first drilling operation the casting is located from the crankshaft main bearings, which are as yet in the rough state. While the casting is in this press, two locating holes are drilled and reamed, from which all succeeding operations are located. Reaming these locating holes is a separate operation and is performed in the first multi-spindle drill by means of a Magic chuck. In the first drill 29 holes are drilled, and in the second 18.

Next the frame casting passes to another pair of multiple spindle drills, one of which is a Natco and the other a Baush. Here, again, is a track between the two drills so that the casting can be moved from one to the other without any great effort on the part of the operators. In these drills the holes on the under side of the casting are drilled and the casting is located by means of the same two locating holes as in drilling the holes in the top. Locating pins are forced into these locating holes from below by means of a crank handle. In the first drill of the second pair 27 holes are drilled, all of these being for the attachment of the oil-pan to the engine; and in the second drill, 8 holes are drilled, which are for the lower half of the transmission.

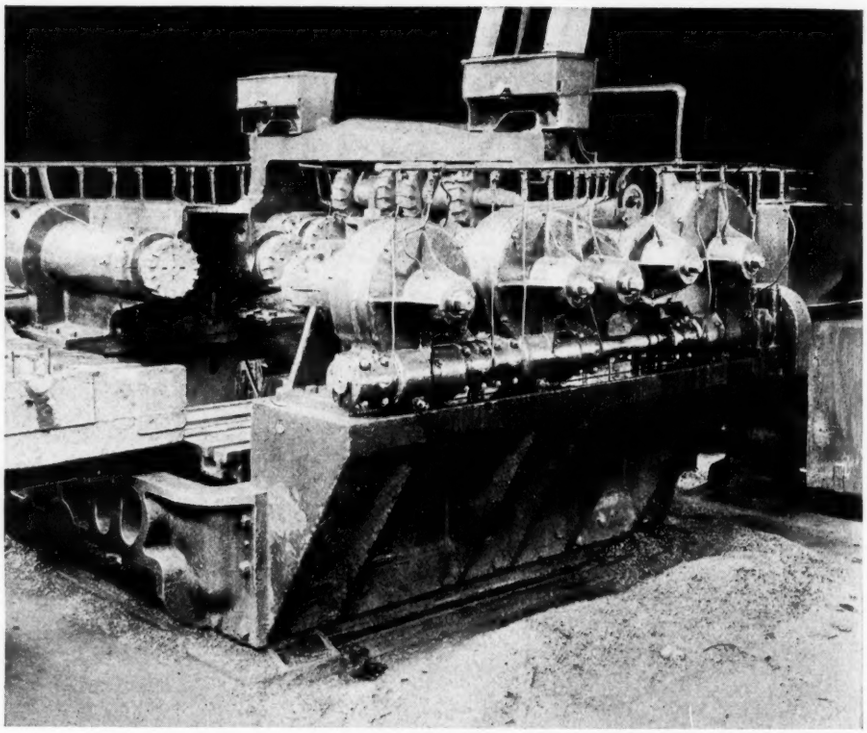


*Fig. 6—Right side of hydraulic feed miller*

The next operation consists in tapping for and putting in the studs which hold in place the crank bearing caps. There are six of these studs, and the operation, which is performed in a Cincinnati Bickford radial drill, is illustrated in Fig. 3. This machine, as will be seen, is also provided with a track on which the casting can be deposited by the hoist and along which it can be slid by the operator.

Next the casting is put into a special milling machine, which is one of the two tools especially designed and built by the J. I. Case T. M. Co. This tool is provided with 15 milling cutters, all operating at the same time, and serves to face off the ends of the crank bearings (insuring the proper spacing of these bearings), the transmission bearings, the rear axle housing bosses and a boss for the front bolster. These 15 milling operations are performed in eight minutes actual cutting time, but the complete time for the operation, including insertion in and removal of the casting from the miller, is about twenty-one minutes.

This milling machine consists of a very substantial, heavily ribbed, quadrangular frame which is open in the center. In this center opening is located the table to which the frame casting is clamped. This table is capable of up and down motion on vertical Vee guides on opposite corners, which are provided with means of adjustment. The side and rear portions of the frame are planed off to a common level and have bearing brackets bolted to them, which brackets carry the cutter heads. The front section of the frame is kept lower, so as to facilitate the loading of the casting onto the table when in its lowest position. In this case also a sort of track is provided which permits of sliding the casting on to the table from a table in front of the tool on which it is deposited by the crane. This track is clearly shown in Fig. 4.

The table of the milling machine is fed upward by hydraulic pressure. Beneath the center of the table there is a vertical cylinder 22 in. in diameter in which there is a piston. The reason for making the feed cylinder of such large diameter is that it also serves as the main guide for the table. The piston has a very long bearing in the cylinder, and being fitted to it with a clearance of only 0.008 in., it holds the table very steady. As far as the necessary lifting force for the feed is concerned, this could be obtained with a very much smaller cylinder, as the oil pressure required for the feed figures out to only 25 lb. p. sq. in.

A supply of oil is carried in a tank at the rear of the machine, and this oil can be forced into the cylinder by means of a variable stroke pump. The pump is of the plunger type and contains 13 cylinders set in a circle on a revolving disk. This large number of cylinders is used so as to make the feed as uniform as possible. All of the 13 cylinders are formed in a unit with the revolving disk which is mounted on a 2-in. shaft. The cylinder bores are 1½ in. in diameter and the cylinders are set in a circle 11 in. in diameter. The pump plungers are hollow and provided with a circular flange at their outer end between which and a shoulder on the outside of the pump cylinder at the bottom there is a coiled spring which forces the plunger out of the cylinder and so draws in oil. The motion of the plungers is controlled by a tilting plate on the face of which there is a ball thrust bearing, with one race or ring of which the heads of the pump plungers are in contact.

As the pump cylinders revolve, the plungers will move outward in them during half a revolution and inward during the other half. The inward stroke is made under positive pressure from the tilting disk and during this stroke the oil is forced from the pump barrel to the hydraulic cylinder. There is only one port in each pump barrel, central in the head thereof, and this is in communication with a semicircular suction port in the pump

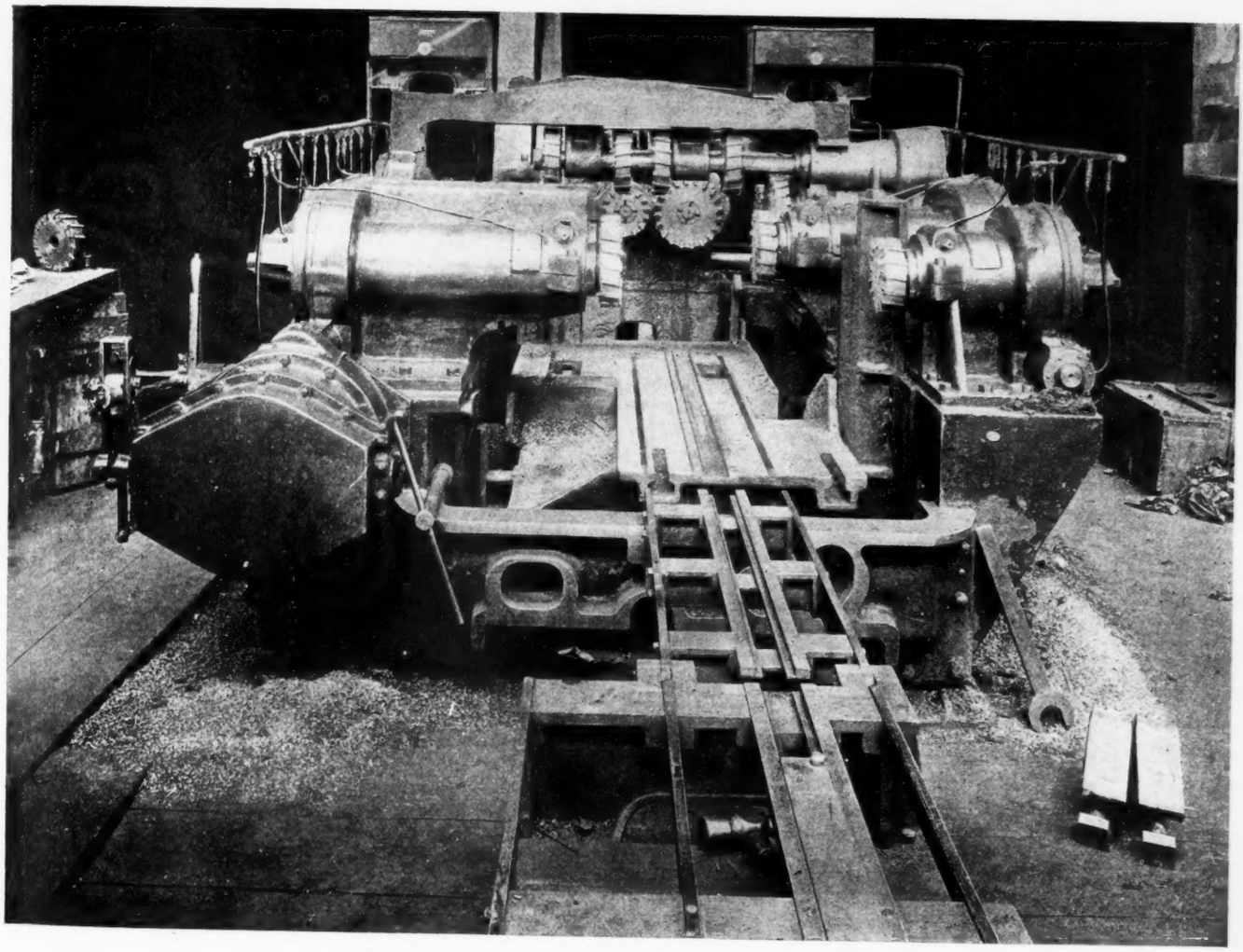


*Fig. 4—Front view of special hydraulic feed miller*

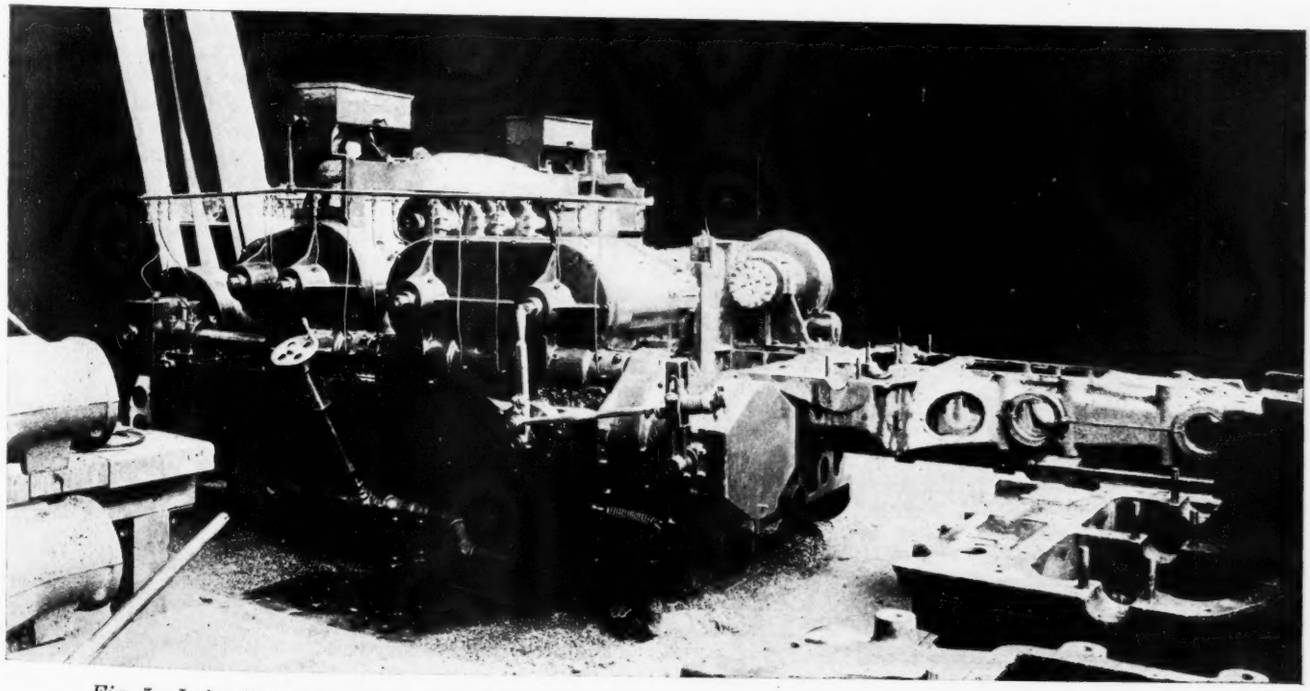


*Fig. 5—Left side of hydraulic feed miller, showing oil pump (on right), feed control lever and quick return valve handwheel*

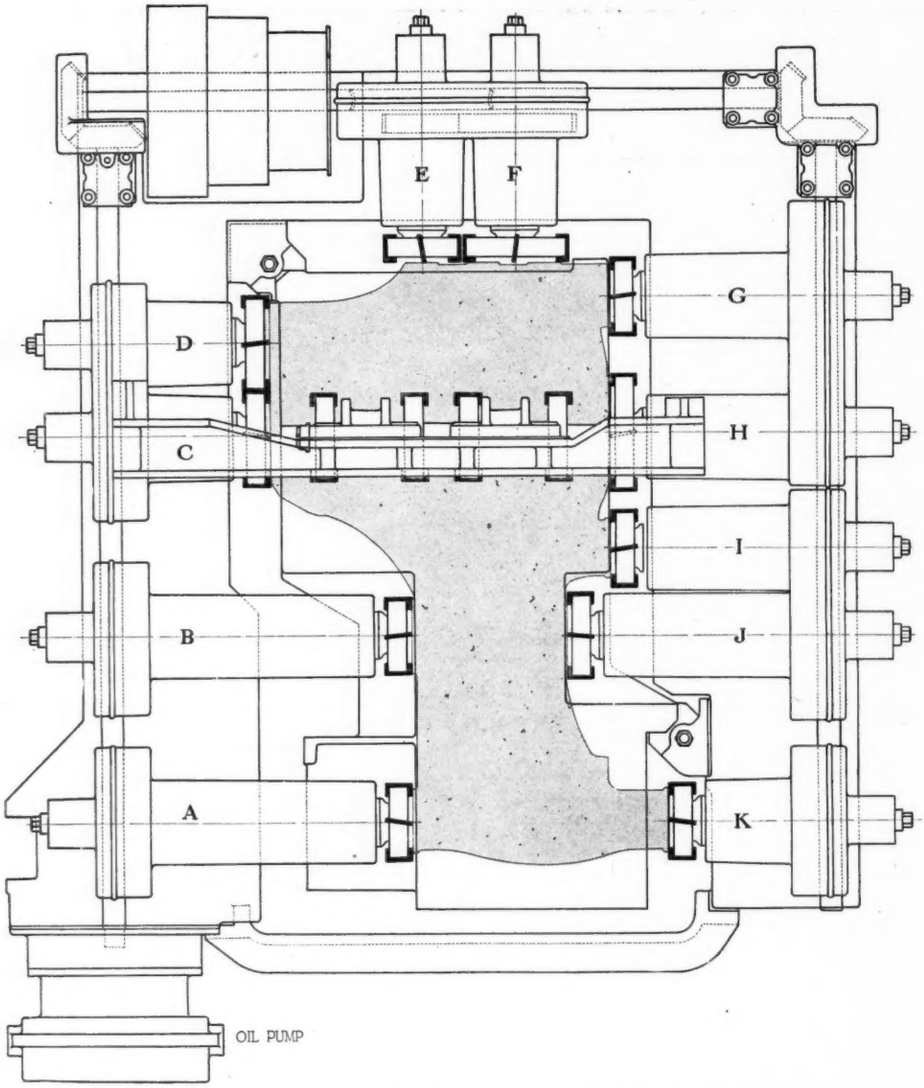



*Fig. 7—Plan of hydraulic feed miller, with casting shown in place*

housing during one-half of the revolution and with a similar delivery port during the other half. These ports in the cylinder heads and in the pump housing perform valve functions and dispense with the need for any separate valves.

By varying the inclination of the tilting disk, the stroke of the pump plungers, and hence the rate of feed, can be varied. This is accomplished by means of a hand lever at the side of the machine, of which a detail assembly is shown. The lever is rigidly held in its set positions by means of a spring latch. The feed is started by tilting the pump disk and stopped by setting it normal to the pump axis. When the milling operation on the casting is finished an oil return valve is opened by means of a hand wheel on the right hand side, allowing the oil from the hydraulic cylinder to return to the reservoir at the back, and the table of the machine then returns to its lowest or loading position. This quick return of the table, secured by draining off the oil from the cylinder, is one of the valuable features. The pump can be clearly seen in the front view of the machine on the left hand side.

One of the detail illustrations shows one of the cutter arbors. These are case hardened and have a tapered bearing with large thrust washers and adjusting nuts by means of which the arbor can be accurately adjusted to run without chattering. These arbors are driven through a worm and worm wheel each.

The cone pulley is located on a cross shaft at the rear of the machine, from which shaft two longitudinal shafts are driven through bevel gears, one on each side. These shafts carry the worms meshing with the worm wheels on the cutter arbors. Two cutter arbors extending in the direction of the length of the machine at the rear are driven direct from the cross shaft, and in addition there is a cross shaft carrying four milling cutters, which is at a somewhat higher level than the other cutters. This cross shaft is driven from other cutter arbors by spur gears.

The casting is clamped down on the table by three clamping hooks at the rear which can be operated by means of shafts extending to the front of the machine, and by two of the conventional screw clamps engaging into T slots in the table at the front. All bearings and gears on the machine are lubricated from two gravity oil reservoirs located at the rear.

Next the casting passes to a multi-spindle boring machine which is the other special tool designed and built by the J. I. Case T. M. Co. for machining this casting. This is an eight-spindle machine, two spindles operating on the crank bearings, four on the transmission bearings and two on the rear axle housing. Each hole is rough-bored, rough finish bored and finished. This machine, too, has hydraulic feed, the cutter heads being fed forward through the rapid traverse by oil pressure from a gear type pump. Then the gear type pump is automatically cut out and a plunger type pump is brought into communication with the feed cylinder. When the cut is finished the gear pump is again engaged so as to return the heads rapidly. The two pumps are controlled by means of a multi-way valve automatically actuated by stops carried by the head carriages. Each side of the machine has a separate belt drive, from the pulley of which on the machine driving connection is made with the cutter head through a splined shaft. At the rear of the machine there is a five-spindle drill head for drilling and reaming for the front bolster. This drill head also has a separate belt drive. Before the casting is put in this boring machine the crankshaft bearing caps are put on.

After coming out of the boring machine the casting is drilled and tapped at both ends. These operations are performed individually in two Natco radial drill presses. For this operation the casting is placed in a revolving jig so it can be worked on from three sides. There is a face plate on the fixture with four indexing holes in it, these being located at right angles to each other.

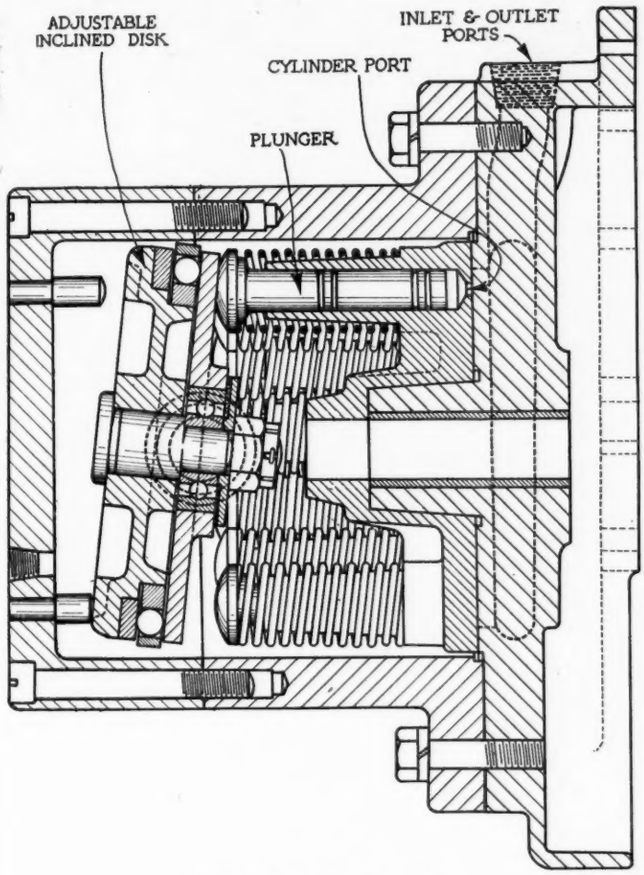



*Fig. 8—Oil pump assembly*

## Details of Hydraulic Feed Milling Machine Built by J. I. Case T. M. Co.

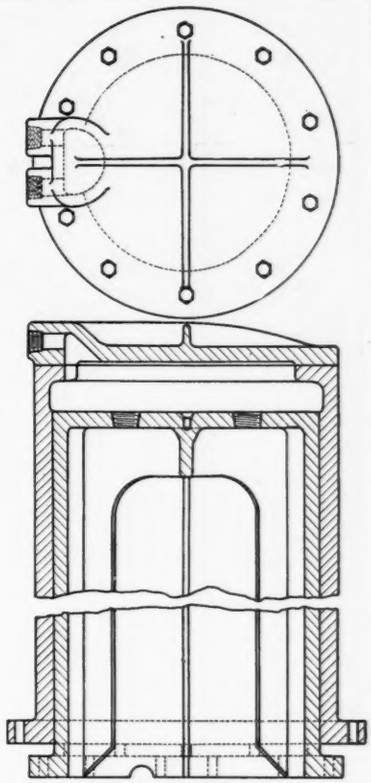


*Fig. 9—End view and section of hydraulic cylinder of milling machine*

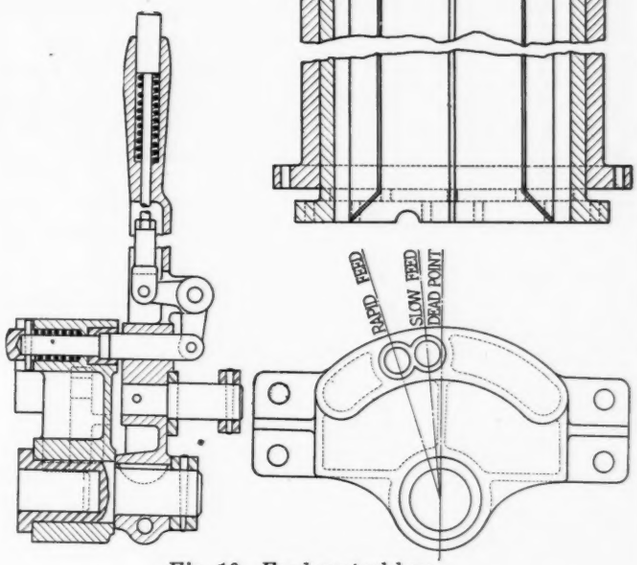



*Fig. 10—Feed control lever*

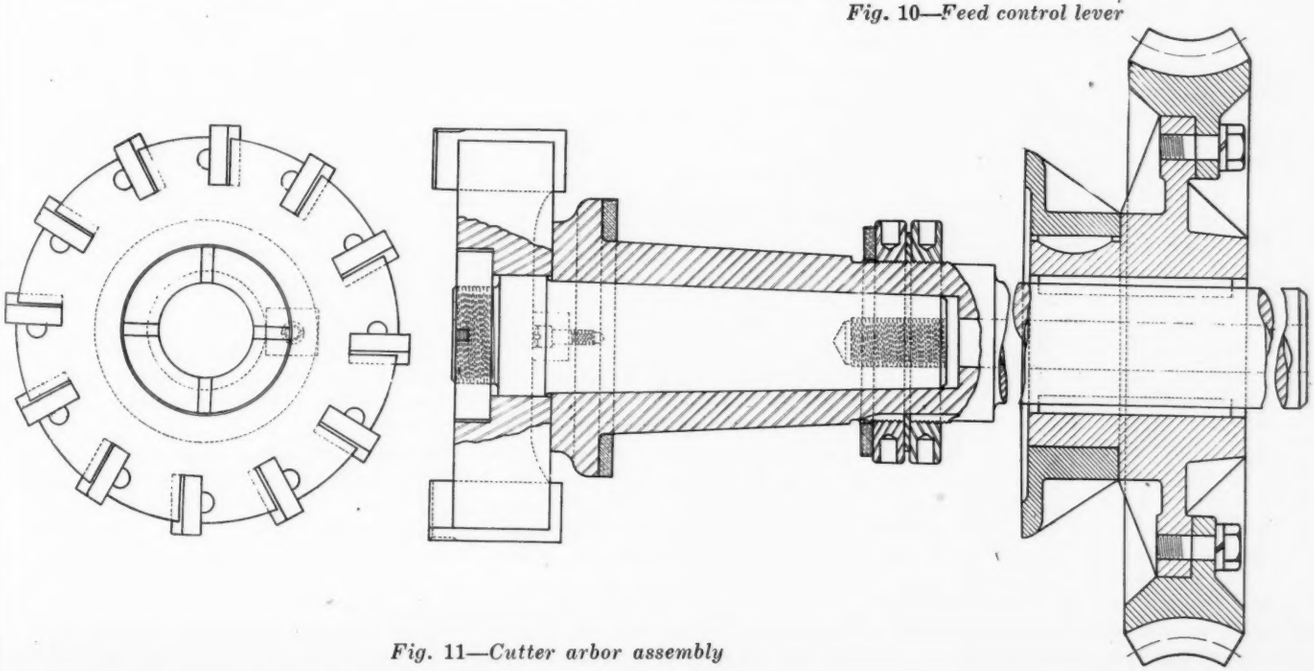


*Fig. 11—Cutter arbor assembly*

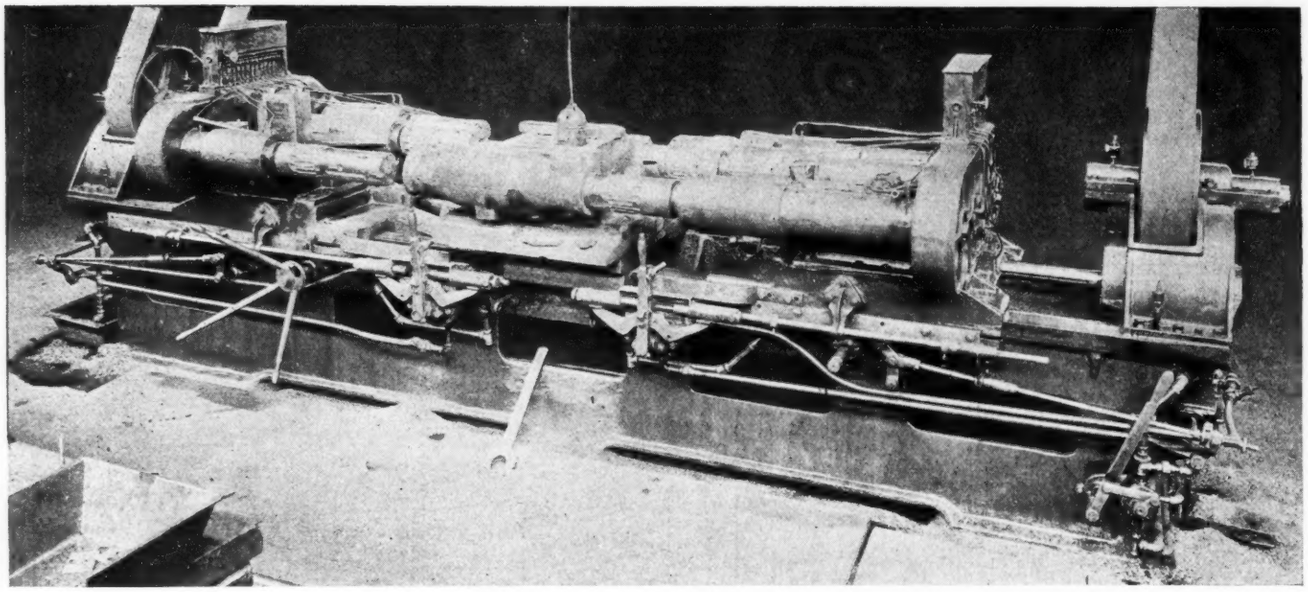


*Fig. 12—Eight-spindle hydraulic feed boring machine*

This completes the machining operations, and the piece is now washed in an alkaline solution to remove all chips and oil. It is then allowed to dry, after which it is painted.

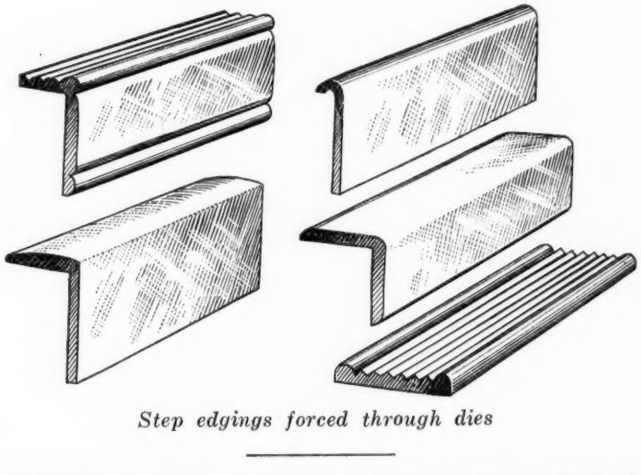
That the J. I. Case company should have been able to develop these machine tools in its own works speaks well for the resourcefulness of its engineering staff. These machines not only insure accurate work, but cut down the labor cost in production, which is so necessary in these times of high wages. Patents have been applied for on the various special tools as well as on the unit frame itself.

## Increasing Application of Extrusion

THE process of extrusion consists in forcing a solid billet of metal through chrome steel dies, and there is considerable latitude with relation to the temperature. A hot billet, of course, passes through a die far more readily than cold metal. For example, at 600 deg. Fahr., aluminum requires only one-fifth the pressure necessary at 70 deg. The characteristics of the extruded pieces vary with the temperature, there being a tendency to harden if the process is carried through at low temperatures. Hence the purposes for which the finished product is to be used must be taken into consideration and the temperature varied accordingly. Little or no additional finishing is required, as the dimensions of the extruded shapes can be gaged with great accuracy.

Step edgings are made in hardened aluminum alloy of straight lengths, and on account of the high coefficient of friction a safe step as well as a neat one is produced. The types shown are but a few among many, for a wide variety is necessary, as body manufacturers frequently have their own distinctive patterns. Moldings for doors, roofs, sashes, cowls and other parts are produced by the same press with a change in the type of die.

A number of manufacturers using extrusion processes for making metal shapes, particularly aluminum, have had to increase the output to meet the demands of the automotive industries. Two of the most powerful presses in the world are now operated by the British Aluminum Co., samples of whose work appear in the illustration, and more than 800 special sections are said to have been manufactured by this one firm since the method was first applied. A general review of the aluminum situation indicates an increasing popularity of the alloys, particularly the extruded sections.



*Step edgings forced through dies*

THE Joint Director of the Agricultural Research Institute of the Government of India, Pusa, Bihar, states that his department is at present working out the details of a proposal to hold trials on a large scale of agricultural motor-tractors some time next year. It will be necessary to carry out the trials on a large scale in some central place, such as Cawnpore, where workshop and other facilities are available, and it is recognized that the expenditure will be heavy. The proposals which the authorities in India are working out contemplate an expenditure which may reach a lakh, or even two, of rupees, as he is of opinion that the trade will expect assistance in conveying the machines and mechanical staff from the ports to the trial ground.

# Highway Motor Traffic Making Headway in England

**Freight lines throughout the country are being co-ordinated with a view of supplying return loads and arranging traffic schedules. Bus owners are running excursions to holiday resorts at lower fares than railroads, and joint passenger stations are being opened by highway line promoters.**

LONDON, August 13.

HIGHWAY motor transport is developing very promisingly in Great Britain, more particularly in England, where the scope is large and the needs greater than elsewhere. This progress is seen from two angles.

*First.*—There is the motor freight service. At this moment, a concentrated effort is being made to link up the villages with the towns and with one another. This is not quite the same as merely linking villages with neighboring towns, as that implies a localized and circumscribed range of traffic, whereas the present development is a real interchange of connected traffic, competing with the railroads and likely to capture a great deal of the railroad short distance or zone traffic in perishable and light wares.

The idea is to co-ordinate all the existing transport clearing houses and traffic agencies in the country. As there are some 600 of these agencies, the basis of a comprehensive road transport scheme is at once at hand. The support of the various chambers of commerce, the Automobile Association, and the Commercial Motor Users Association has been enlisted by the promoters of the scheme —termed the Association of Road Transport Clearing Houses.

The increase in railway freight rates will doubtless give a fillip to the venture, and it is hoped that the service will demonstrate to the public the practicability and value of this modern method of transport. At the same time it will assist the motor transport firms by keeping their trucks continually employed with a load, and so place them in a position to compete better with the railways.

*Second.*—There is the development of public highway passenger vehicle traffic. This has attained enormous dimensions, the more notable because almost all of it is of quite recent origin. That the railroad service is fearing the growth of this traffic is indicated by recent events. As is generally known, the Government took control of railways in the war period and continues to control them, the stockholders being guaranteed the same dividend they received in 1913 (the year before the war started). Hence all matters concerning the public interests and the railroads are voiced in the legislature. There is no competition between the companies, such as used to exist, and the results are becoming increasingly objectionable.

Recently the control authority—the Ministry of Transport—when urged to re-establish the pre-war excursions on the railways, answered that the shortage of locomotives quite precluded any chance of such facilities being given this year. Then the people began to take to the motor services, and now there are thousands of these vehicles touring the country, at rates which the present rail fares do not compete with.

Roughly speaking, the British pre-war railroad fares averaged 2 cents a mile; it is now about 75 per cent higher, and on Sept. 1 the freight rates will be 100 per cent higher than before the war. An average long distance (as distances go in Britain) train seats 700 to 800 persons; an average motor vehicle, of the char-a-banc sort, seats 30 persons, so that from 23 to 30 char-a-bancs replace one long distance train. Some figures just made public are very significant. In one week, seven days, twelve hours a day, a Lancashire census showed the following numbers:

Preston-Blackpool road—2381 motor omnibuses and char-a-bancs and 909 motor trucks and trailers.

Lancaster-Preston road—1746 omnibuses and char-a-bancs, 966 trucks and trailers.

Liverpool to Manchester (one road)—162 omnibuses and 3856 trucks and trailers.

On the recent August holiday a quarter of a million people are estimated to have left London for the seaside by public motor vehicle, and on a counted day at Goodwood races 7000 persons went there in char-a-bancs.

Now, the railroad people, after refusing to consider cheap fares for holidays, are vying with one another to run special trains, and generally at a special rate, for the single trip. Even so, it is doubtful if they can compete with the motor vehicles as regards the cost to the users. For instance, the London-Brighton (51 miles) excursion rail fare costs now nearly $2 one way, whereas motor cars are charging only a trifle more than $3 for the round trip.

With the developing use of giant air tires, the speed of these road cars will be increased, so that *an average rate of* 20 *miles an hour* may be looked for in the near future—legislation being required to sanction this increase of speed for public service cars—which would be about double the present average rate of speed. This service would cost one-half to one-third less than the more speedy railroad excursion train.

It is certain that a road tax will be imposed on public service motor vehicles; at present a rate of 4 cents a vehicle mile is spoken of. On a 50-mile run this would cost the owner of the vehicle $2. It is very possible, however, that this increased cost will be saved in reduced wear by using pneumatic tires.

Recently the first motor coach station was opened at Manchester. It resembles a railroad station, in having the usual offices and waiting rooms and a service of porters. Already there are notices appearing in the newspapers that these services are to be continued as long as the roads will permit.

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IT is reported from Switzerland that during the war the number of automobile tire sizes in use in that country decreased from 232 to 9 as a result of standardization.

# Discussion of Materials for Tractor Bull Gears

**In a plea for a better tractor, the writer takes up the problem of blanks for the transmission and discusses in turn the advantages and handicaps of cast iron, cast semi-steel, cast steel, forged steel and rolled steel. Each material is discussed from the service and the construction viewpoint.**

By W. H. T. Thornhill*

A CAREFUL study of the farm tractor industry as it exists reveals two outstanding facts of paramount importance. These are that tractors must be built of better quality—and by this is meant quality of materials, design and workmanship—and service conditions must be improved considerably. It seems to the writer that the tractor industry will never attain the position that it deserves until these facts are realized to the fullest extent and steps taken in all seriousness to improve conditions.

Owing to the shortage of farm labor, the high price of farm products, the deficiency in the acreage of cultivated land, the increased demand from abroad and the spirit of unrest that is making itself felt on the farm, the opportunity for the introduction of power farming machinery is very bright. **Before full advantage of it can be taken, however, much of the prejudice and skepticism prevalent in a great many communities on account of the poor performance of some of the earlier models of farm tractors—and, as a matter of fact, of some of the present jobs—must be eradicated and the improvements mentioned must be made.**

The purpose of this article is not to discuss all of the above in detail, but to consider one small element relating to the general subject of quality. It is small only when considered relative to all the various elements of quality, but is of tremendous importance as it concerns the subject of the material to be used for gear blanks in the transmission, than which there is hardly a more important part in a farm tractor—not even the motor.

A farm tractor transmission consists of a train of gears, usually of three reductions. In this train, which may be made up of all spur gears or a combination of spur and bevel gears, all the power developed by the motor to drive the tractor, with the exception of the part consumed in friction, is passed. As horsepower is a direct function of speed and load, it is evident that the first gears in the train, which travel at the highest speed, carry the lightest tooth load of any of the gears and the last gears in the train, which travel at the lowest speed, carry the heaviest tooth load. For this reason the hardest service occurs in the case of the last gear in the train; it is the material used for this gear that is the subject of this article.

The form of this gear, usually known as the bull gear, depends on the type of the tractor. In the case of the live axle design it is a solid gear mounted on the rear axle, in which case the differential is mounted on the intermediate shaft, or it is in the form of a ring fastened to the differential, which is attached directly to the rear axle. In both of these constructions the wheels of the tractor are fastened to the rear axle and are revolved by it. In the case of the dead axle design, the wheels of the tractor revolve on the axle, which does not turn, and are rotated by means of the bull gear, mounted directly on the wheels. This description has reference, of course, to the conventional designs of tractors now on the market.

**Materials Used.**—The materials now in use for the bull gears are cast iron, cast semi-steel, cast steel, forged steel and rolled steel. All of these terms are undoubtedly familiar, with the exception of the latter, which has no reference to the "rolled steel" produced on a rolling mill of the type of a bar mill, merchant mill, rail mill and similar mills.

By rolled steel is meant a section rolled on an ingenious mill especially designed for the production of circular sections that are solids of revolution, such as gear blanks, flywheels, pipe flanges, rings, steam turbine bucket wheels, car wheels and similar products. A description of this mill would make an article in itself; in brief, the sections are rolled hot from a cylindrical piece of steel, cut from a rolled bloom, between dies of the proper shape which are caused to approach each other while being revolved about their axes; the axes of the dies and of the section being rolled coincide. In passing it may be stated that the operation of this mill is about the most interesting of any of the steel mill equipment that has ever been built.

Of all the materials mentioned above the most desirable for bull gears is rolled steel or forged steel, and of the two the former is the better. On account of the extraordinarily severe service encountered by the bull gears in operation and the necessity of preventing any chance of accident occurring to them because of their importance in the tractor no compromise in the case of material is allowable; it should be the best that it is possible to obtain. That rolled steel fulfills this requirement better than any other material will be obvious from the following discussion. It seems as if the best way to elucidate the subject is to point out the various disadvantages of all forms of castings in comparison with rolled or forged steel gear blanks and then take up the case of the relative merits of the latter two.

Before starting this discussion it should be pointed out that forged or rolled bull gear blanks for tractors cannot be furnished with the teeth rolled or forged in them; the teeth must be cut in the rim which is furnished solid. Castings, on the other hand, can be furnished with cast teeth or with a solid rim in which the teeth must be cut. The question of cast versus cut teeth for gears is an important one in tractor operation and properly should be

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considered at this point in the discussion. The disadvantages of cast teeth are:

1. Loss of power.
2. Liability of breakage.
3. Noise.
4. Excessive wear.

All of these disadvantages are reduced by the adoption of cut teeth and some are eliminated entirely.

**Loss of Power.**—With cast teeth the loss of power in the operation of a train of gears is greater than with cut teeth, and in some cases it is excessive. In any train of gears a certain amount of friction is bound to occur but it may be kept down to a minimum by the use of certain forms of teeth which have been devised by engineers as the result of extensive experiments and study as well as research work, the main object being to realize rolling friction to the elimination of sliding friction. If the theoretical shape of the teeth is not realized in practice a loss of power is inevitable. The theoretical shape of the teeth can never be attained in the case of cast teeth. One reason for this is that the teeth on the pattern must have draft (unless cored teeth are employed) so that the pattern can easily be withdrawn from the sand; consequently the teeth on the finished casting are thicker on one side than on the other. In meshing such teeth with others a line contact will not result. In addition it is impossible to entirely prevent disturbance of the sand when removing the pattern from the mould and irregularities in the mould into which the steel is poured will result so that the shape of the teeth as cast does not follow that intended by the designer. It is impossible in cutting the teeth on the pattern to make them all exactly alike and of the required shape. Cored teeth reduce the likelihood of these conditions occurring, but do not eliminate them, due to the unavoidable variations in the cores.

Different temperatures of the hot metal in the mould will cause different shrinkages, and, therefore, destroy the theoretical shape of the teeth. Another distortion of the shape of the teeth occurs due to the action of the spokes (in the case of spoked gears) in cooling. The spokes naturally contract in cooling and tend to pull the rim at the points where the spokes are attached, in toward the hub. As this tendency does not exist to the same extent and as the sand in the mould prevents it from taking place, at points on the rim midway between the points of attachment of the spokes, the rim is distorted and given a wavy effect which prevents realization of the theoretical shape of the teeth. In the same or similar ways flanges, lugs and projections of different kinds for attachment of the ring gear have a tendency to distort the rim due to unequal cooling.

**Liability of Breakage.**—Liability of breakage of cast teeth is great because the draft of the teeth and the unavoidable roughness of the surface of all castings are liable to throw the load on a point instead of a line which is the entire width of the face of the gear. The intensity of the loading of the tooth is thereby increased many times beyond that calculated by the designer; if the load is an excessive one, suddenly applied, as in shock, which is so prevalent in tractor operation, it is quite possible to break off the tooth.

**Noise.**—Noise is always present to a great extent in the case of gears with cast teeth and is unavoidable from their very nature. This question of noise may not seem to be of any importance at the present time, because very few tractors are even equipped with mufflers, and as a result the noise of the exhaust of the motor almost drowns any noise of the gears. In the future, however, it seems possible that this condition will be changed and an effort will be made to reduce noise to a minimum, as in the automobile and truck industry. The reason for attempting to reduce noise is to enable the operator to more readily hear any unusual sounds, which usually indicate mechanical troubles that may develop in the operation of the tractor.

**Excessive Wear.**—With cast teeth there is bound to be excessive wear, principally when the tractor is new, as the high spots of the contact points of the gears will have a tendency to wear down rapidly, due to the excessive loads resulting from the lack of line contact between the teeth as mentioned before. This means that backlash in the gears results; in starting or stopping this backlash naturally results in shock to the gearing and motor. This wearing down will, at points, wear off the casting skin on the working surfaces of the teeth, which skin is relied on to resist wear, thereby exposing the softer material beneath that will wear very much faster. As soon as wear gets below the casting skin it proceeds rapidly.

**Structure of Materials.**—To proceed to the subject of the materials to be employed in bull gears, it should be realized that in the case of all castings of iron, semi-steel and steel the structure consists of crystals of various shapes and of a wide range of sizes and locations relative to one another. The grain structure is very rough and irregular and is in the worst possible condition for service. This is true of steel ingots as well as of finished castings. In the case of forged or rolled steel gear blanks the sections receive several hot workings in blooming mills, rolling mills, hydraulic presses or similar equipment, depending on the process employed, which working breaks up mechanically under tremendous pressure the poor grain structure of the original ingot.

In the case of cast gear blanks, which are a finished product as far as shape is concerned, no further mechanical working of the material is possible. As a result of the various workings, while heated, that it receives subsequently to casting of the original ingot the physical properties of the forged or rolled-steel gear blanks are very much superior, even without heat treatment, than those of the castings; furthermore, this improved structure lends itself more readily to successful heat treatment, thus opening the field for much better physical properties. This characteristic of higher physical properties is probably the most important advantage from an engineering standpoint of forged or rolled steel gear blanks, as fundamentally adequate strength with the minimum weight is the desideratum.

In the case of castings regardless of whether the teeth are cast or cut from the solid, there are liable to be shrinkage cavities and blowholes, and invariably there are shrinkage strains. This is particularly true of steel castings, on account of the greater shrinkage of this material as compared with cast iron or semi-steel. Such defects are particularly liable to occur in the case of spoked gears at the juncture of the spokes with the rim and with the hub, because the metal in the rim and the hub is prevented, to a certain extent by the sand in the mould from following unrestrained the spokes as they contract in cooling. Blowholes are usually found in more or less numbers at the surface of the rim which is the worst place to have them.

**Curing Defects.**—Defects of this nature do not occur with forged or rolled steel gear blanks, for two very good reasons:

In the first place, only a certain percentage of the bottom of an ingot is used, thus insuring sound metal;

In the second place, whatever slight looseness there may be in the texture of the section of the ingot used, is

consolidated and closed up by the tremendous pressures to which the material is subjected in manufacture. These gear blanks are absolutely solid and homogeneous in respect to the grain structure of the steel. In addition these gear blanks can only be produced with a solid web, and there is no cooling of the metal under confinement.

Another disadvantage of castings is that there is liable to be more or less segregation in the finished product. This also is true of steel ingots, but in the case of forged or rolled steel gear blanks practically no trouble of this nature is experienced, because segregation takes place to its greatest extent in the upper part of the ingot, which part is discarded in the manufacture of the gear blanks. Whatever slight indications of it, if any, appear in the section of the ingot used for the manufacture of the gear blank, is mechanically distributed more or less throughout the mass of the section when it is rolled.

**Control of Shrinkage.**—In order to keep the shrinkage of steel castings to the minimum, it is desirable to keep the carbon content of the steel as low as possible, for the reason that the higher the carbon content in the steel, the greater is the shrinkage in the mould. A happy medium seems to be to use 0.25 per cent carbon in the steel. This steel is not very resistant to wear, especially wear of the kind found in tractors operating with bull gears exposed in a cloud of dust, containing silica, a very hard substance, which makes a very good grinding compound when mixed with grease.

This will be clearer when it is understood that, other things being equal, the higher the carbon content in steel the harder it becomes, and, naturally, the harder it is the better it will resist wear. The forged and rolled steel gear blanks are not subject to a handicap of this nature, as it is possible to produce them of practically any carbon content or grade of alloy steel that may be required.

Castings are very liable to contain a little of the moulding sand in the skin; this makes an abrasive spot and prevents the metal from being uniform as far as cutting qualities are concerned, a defect not common with rolled steel gear blanks.

The practical applications of the above facts as they affect the manufacturer and user of farm tractors will now be considered.

As far as the higher physical properties and the better grain refinement of the forged or rolled steel gear blanks are concerned, it can readily be seen that the liability of breakage of the teeth due to a shock, an obstruction in the gears or the load on a tooth occurring at a point instead of on a line, is considerably reduced, for the reason that the metal is stronger and will stand more abuse than the metal in castings. By utilizing the proper design of teeth with gear blanks of the right composition and heat treatment, the gear teeth are practically unbreakable and should last longer than the tractor in which they are installed.

**Weight.**—Excessive weight is always found in the case of cast gears and results from the fact that cast material is notoriously weak under shock due to its poor grain structure; designers therefore always figure on a very small fiber stress in them and accordingly make them extra large, in order to reduce the liability of breakage taking place in operation. Because of the large number of teeth in the bull gears, they become heavy and very cumbersome. This extra weight requires extra power to haul it around the field; naturally, the effective drawbar horsepower of the tractor and its reserve power—a most important item—are reduced, or, conversely, a large motor is installed which adds to the whole weight of the machine.

Owing to the much better physical properties and grain structure of the forged or rolled steel gear blanks, the allowable tooth pressure can be increased considerably above that used for castings. It follows naturally, then, that the teeth can be made smaller. By keeping the same number of teeth in the gear in order to maintain the gear ratio of the transmission, the outside diameter of the gear can be made smaller and in some cases the width can be reduced. Because of this reduction in size the gear, of course, becomes lighter. By reducing the diameter of the gears it is possible to realize a more compact design and therefore save weight in the resulting shorter frame, smaller gear enclosure and similar changes that will result.

Shrinkage cavities, blowholes and shrinkage strains in castings are of very great concern to manufacturers and users. They are an item of expense to the manufacturer, for the reason that they result in considerable scrapping of gear blanks. If teeth are cut in the casting, it is no uncommon thing to run into a cluster of blowholes during the machining of the gear blank, of such magnitude that it is dangerous to finish the gear blank and install it in the tractor. Sometimes an attempt is made to weld up such defects, but it usually does not work out satisfactorily, as the welded material is likely to tear out when machining is resumed and the cutting tool is then liable to break as it strikes the far side of the hole. In any event, machining speeds, when blowholes are encountered, must be decreased because of the possibility of tools breaking. There is no loss to the manufacturer as far as material is concerned, as the manufacturer of the cast blanks will replace the defective ones free of charge, but there is a loss of the time and expense involved in the machining of the cast blanks up to the point of scrapping, as there is no reimbursement for this. In comparisons of costs this important item of the calculations is frequently neglected.

**Hidden Perils.**—Shrinkage cavities and shrinkage strains are elements of peril to the user of the tractor as these defects usually occur at a point where there is no machining. They, therefore, remain hidden from view, and together with such blowholes as may not be uncovered in machining, are a source of danger. If a cavity or blowhole exists the area of the section where it occurs is reduced below that figured by the designer and breakage is therefore possible after installation of the gear in a tractor. This element of unreliability of castings is one of their greatest drawbacks and should mitigate against their use for bull gears in tractors.

Because of the hard spots and sand pockets likely to occur in the production of castings the times for the various machining operations on a gear blank are necessarily reduced below that required in the case of rolled steel gear blanks.

Segregation in the metal is also liable to reduce the production in the machine shop because of the possibility of running into hard spots that result on account of the lack of uniformity. The item of segregation, like the occurrence of blowholes and shrinkage cavities, is a source of danger in cast gear blanks, on account of the non-uniform character of the metal.

**Forged Gear Blanks.**—This sums up the relative merits of forged and rolled steel gear blanks in comparison with those of cast iron, cast semi-steel and cast steel. It is now in order to consider the case of forged gear blanks versus rolled steel gear blanks. The following discussion will show that the rolled steel gear blank is superior to the forged steel one.

In the first place, as mentioned before, the most desirable attribute of a gear blank for the bull gears in

tractors is high physical properties, but above all proper grain refinement of the steel; this is most easily accomplished, commercially, by working of the steel, while hot, after casting. On account of the process employed, the rolled steel gear blank receives considerably more working, while hot, than the forged steel one does, and, consequently, other things being equal, it has a better grain refinement.

Another thing in favor of the rolled steel gear blank is the reduced amount of scale on the finished product. In manufacturing, the blank is operated on while it is in a vertical position and while revolving. The scale produced on the steel is loosened by the flow of the metal and falls off. With forgings the dies are horizontal and as a consequence a lot of scale remains in the bottom die after a forging is removed. It is usual to direct a stream of compressed air into the die to blow out this scale, but sometimes, on account of the shape of the profile of the die or other causes, all of the scale is not removed. When the next blank is placed in the die this scale is forged into the steel; if it adheres it causes a hard spot which is bound to cause trouble in machining and if it falls off the section it leaves a depression which may be below the surface of the finish line of the gear in case the forging is a little scant.

**Some Advantages.**—It is usually possible to work to closer limits of size in the case of rolled steel gear blanks than with forged steel ones. The allowance of metal for finishing is therefore smaller or the tolerances on size can be closer than with forgings. Of course, if the gear blanks are furnished rough machined all over, there would not be any difference in the amount of stock allowed for finishing or in the tolerances. It is usual, however, to only rough machine on the outside diameter, the faces of the rim, the faces of the hub and rough bore. The web is left "black" as it comes from the rolling mill or forging press or hammer. The web in this case is usually much closer to size on a rolled steel gear blank than on a forged one. If the forged one is machined on this surface also, to correct this trouble, it is an added expense.

It should be stated that in the case of tractors utilizing a large cast bull gear attached to the rear wheels, it is impossible usually to substitute a rolled or forged steel one without a change in design, as such pieces are frequently too large for the capacity of the rolling mill or forge shop equipment. There is no advantage in such cases in the adoption of the rolled or forged steel sections unless a change in design is made so as to utilize one of the cardinal advantages of such material reduction in weight and compactness of design.

**In conclusion,** all of the evidence based on theory, practice, experience and economy seems to point to the rolled steel gear blank as the only logical one for the bull gears of farm tractors. It is absolutely dependable and reliable, there are no scrap losses, as every gear blank received from the manufacturer is a good one, and it compares favorably in price, taking all things into consideration, with any other blank. In a good many cases it is cheaper to use the rolled steel gear blank than to use any other type.

# A Wheeled Tractor for Oil Field Use

FOR some time oil producers have been demanding a tractor for pulling out rods, tubing and casing on oil leases. We illustrate herewith the Avery 12-25 hp. tractor with oil field winch, which was especially developed to meet this demand.

The operating levers on the winch are so arranged that they can be handled by the man at the mast as easily as he operates the brake and drum with a team of horses. The ordinary pulling crew of three men is sufficient, and horses and drivers are done away with. The winch is located at the front of the machine and the control mechanism is operated by a man standing on the ground. Often it is a question of pulling the tubing an inch at a time, and where the operator cannot see the work going on, he has to be signaled to by someone else, in which case the winch is apt to pull the tubing out too far.

The winch takes its power direct from the motor by means of two sprocket wheels and a roller chain. The small sprocket is secured to the engine flywheel and the large one to the winch countershaft. A speed reduction of 3 to 1 is obtained by this gear. A dry plate type of clutch is used on the winch, and is located on the countershaft of the drum. Moving the clutch lever forward engages the drum and drives the drum forward, while pulling the lever back halfway stops the drum, and a further pull backwards reverses the drum through a planetary reversing mechanism.

Located on the spool is a service brake 17 in. in diameter and 3 in. wide, lined with Raybestos. It is operated by a lever conveniently located in front with the clutch lever. The brake lever can be locked in any position by means of a ratchet quadrant. The countershaft and drum shaft of the winch attachment are of cold rolled steel, each 2½ in. in diameter. The pinion on the countershaft and the large gear on the drum shaft are cast steel and semi-steel respectively. The diameter of this winding drum spool is 7 in., while the flange on either side is 19 in. in diameter. The width of the spool between flanges is 16 in. The spool is mounted on babbitt bearings which are lubricated by grease cups. The bearing is split at such an angle that the load comes at right angles to the split.

This winch will handle approximately 5000 lb. at 150 ft. per min. and in reverse operates at a speed of 225 ft. per min. The spool will carry about 1300 ft. of ½ in. cable, 850 ft. of ⅝ in. cable, 570 ft. of ¾ in. cable, and 410 ft. of ⅞ in. cable.

*Avery 12-25 hp. tractor with winch especially developed for use in oil fields*

## Fuel Economy as a Result of Increased Expansion

*Editor* AUTOMOTIVE INDUSTRIES:

I WAS very much interested in your editorial in the Aug. 19 issue under the heading "Fuel Economy."

While the general trend of the current discussion is to make the fuel fit our present engines, you have hit the nail on the head by suggesting that the engine should be designed to fit the fuel.

Of course, when fuel could be bought for 5 cents a gallon in the early days of the automotive industry, little attention was paid to efficiency, and simplifying the engine and cutting down the weight resulted in the adoption of a throttling butterfly valve to control the speed, though engineers recognize the losses incident to the rarified mixture and low compression at light loads.

Twenty years ago I designed and built a complete expansion engine, which showed a thermal efficiency of 27 to 29 per cent—from 30 to 50 per cent more than standard engines of the same capacity. For a description of this engine see Transactions A. S. M. E., volume 22, page 312; if you wish I will send you a log of tests made after this paper was published.

From the discussion and meager reference to the Bavarian engine in your report of the S. A. E. Ottawa Beach meeting, I believe the efficiency obtained must have been accomplished by making the expansion during the working stroke greater than the compression from atmospheric pressure.

In my complete expansion engine I reduce the terminal temperature over 1000 deg. Fahr. and release the exhaust at about 21 lb. absolute.

My complete expansion engine had a piston rod through three explosion chambers and a piston speed of only 666 ft. p. min., neither of which was conducive to high efficiency. In fact, the explosion chamber without the piston rod always showed an M. E. P. 3 to 4 lb. higher than with the rod. When this engine was brought out and described, an editorial in the *Horseless Age* admitted that "with such a cycle a great economy of fuel is possible but what's the use, when gasoline expense is the least of our maintenance and trouble."

The original complete expansion engine cut off earlier as the load got lighter, eliminating the loss of wire drawing, but the inefficiency of low compression still remained.

In 1916 I described a cycle (see Vol. 2, 1916 Transactions S. A. E., page 489) which will secure at full load the benefit of complete expansion and maintain almost as high efficiency through the whole range of load.

This is accomplished by cutting off later, as the load gets lighter, thereby increasing the compression inversely with the load and at the same time decreasing the fuel until when a cylinder *full* of mixture is compressed, there will be just enough hydrocarbon content to keep the engine up to speed. I believe engines built on this cycle will save one-third the gasoline now used in automotive engines. If in your opinion there is anything radically wrong in this theory, I will be very glad indeed to hear from you. The mechanism for accomplishing the results desired is very simple and the subject of a patent application.

C. E. SARGENT.

## Give Thought to the Farm

*Editor* AUTOMOTIVE INDUSTRIES:

I MUST say, in relation to your leading article in the issue of Aug. 19 on "How the Industry Can Help to Build Its Best Market," by Neal G. Adair, is rather a new thought and unusually timely. It would be a great combination—that of the automotive industries and the farmer. From the labor viewpoint, the farmer is none too friendly to the automobile manufacturers.

The writer has been writing and working along the line of trying to help put the farmer in a better position financially, or rather maintain him in the position that he was at the close of the war; also to better his living and social conditions so that more people, even retired motor vehicle manufacturers, would not only regard it as the ideal to round out their career in the country life, but actual rural surroundings would become so attractive as to put the trend, more or less, from city to farm instead of the reverse, as now. I can see an outline of many new features to be fostered and developed by our Federal Agricultural Department through the agricultural colleges indirectly and by its own emissaries dealing directly with the farmer.

This appeal by Mr. Adair, it is to be hoped, will get a responsive chord from the entire automobile industry. Other industries and other classes may well get behind the farmer or act in conjunction with him. The soils of the farm must be fostered; the cities will take care of themselves.

HYATT L. FROST.

Connersville, Ind.

## Lucand Not the Designer

THROUGH an error in the description of the Hermes car, printed in AUTOMOTIVE INDUSTRIES of Aug. 5, A. Lucand was mentioned as designer. We wish to state that Mr. Lucand was merely describing the car for Mr. Demos, the constructor, who has sailed for Greece. Mr. Demos has not announced the name of the designer. We have received a letter from Mr. Lucand requesting the correction.

RECENT Bureau of Mines reports are:

(a) Recent Articles on Petroleum and Allied Substances, compiled by E. H. Burroughs;

(b) Factors in Determining the Gasoline Content in Natural Gas by the Absorption Method, by D. B. Bow;

(c) Some Physical and Chemical Data on Colorado Oil Shale, by M. J. Gavin and L. H. Sharp.

THE United States Bureau of Mines is releasing a four-reel moving picture film entitled "The Story of Petroleum." This film, which is described by the title, is loaned to organizations desiring it for educational purposes.

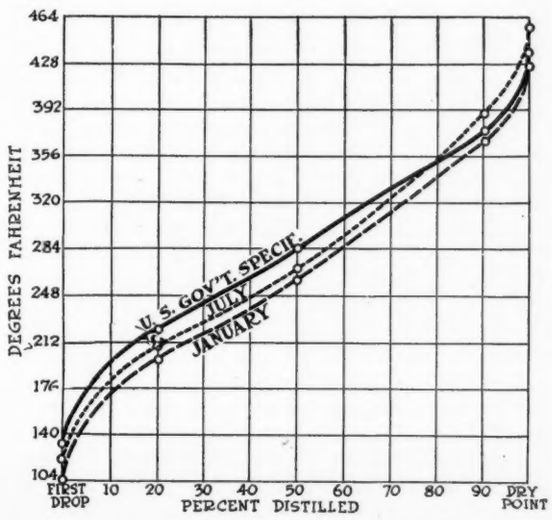
# Motor Gasoline Survey of Bureau of Mines

**Tests of samples taken in various large cities of the country during the latter part of July compared with similar tests made in January last. Increase in average boiling point regarded as seasonal change.**

INTERESTING figures regarding the quality of the motor gasolines sold in the different large cities of the country are found in a report by N. A. C. Smith, Petroleum Technologist, just issued by the Bureau of Mines as Report No. 2149.

It has been common knowledge in the petroleum industry, that the volatility of motor gasoline manufactured for sale during the summer months is less than that of gasoline made and sold in the winter. A year ago, when the Bureau of Mines was making plans to institute semi-annual surveys of the motor gasolines sold throughout the United States, this fact was taken into consideration. It was decided that the last half of January would be the most satisfactory time to take samples representing the winter grade of gasoline; and the last half of July was adopted as the time to take the summer samples. The second semi-annual survey has just been completed and the analytical results apparently show that there has been a greater decrease in the volatility of motor gasoline than can be accounted for as the normal change.

Eighty-two samples of motor gasoline were collected from seven cities, as was done in the first semi-annual survey conducted in January of this year. These cities were New York (including Brooklyn), Washington, Pittsburgh, Chicago, New Orleans, Salt Lake City and San Francisco (including Berkeley). The samples taken were tested, the specific gravity at 60 deg. Fahr., the corresponding Baume gravity, the first drop, or initial boiling point, the 20, 50 and 90 per cent points, the end point, the average boiling point, and the per cent recovered in the receiver being determined for each sample. The original report contains a table giving the temperature at which the first drop passes over, the 20 per cent, 50 per cent, 90 per cent and dry points, as well as the average boiling points.




In the tests, two samples were found which contained so much high boiling material that it was impossible to determine the end point by means of the standard distillation thermometer which covers a range up to 518 deg. Fahr. We reproduce herewith a table giving the average values for all samples taken in any one city, as well as a distillation chart giving the grand average distillation curves for January, 1920, and July, 1920, and the U. S. Government specification curve. It will be noticed from the distillation chart that up to the 75 per cent point the two curves for January and July are closely parallel. It is considered probable therefore that the change in volatility up to this point is due to the normal variation from winter to summer quality. Above the 75 per cent point, the whole curve rises very rapidly and crosses the curve of the specification for Federal purchases. Part of this rise is undoubtedly normal, as representing the usual seasonal change in quality; part of the increase is due to a few samples which contained much kerosene, thus raising the average of the whole series.

These two factors, however, are not sufficient to account for the entire rise in boiling points. The remainder is probably due to the increase in demand for motor fuel over previous years. To obtain sufficient gasoline to supply this demand, it has evidently been necessary for the refiners to cut deeper into the crude oil, thus adding somewhat to the amount of high boiling material marketed as motor gasoline. That there has been an increase in demand is evidenced by the following table showing the domestic consumption of gasoline for the first five months of 1919 and 1920. These figures are taken from the refinery statistics compiled by H. F. Mason, Petroleum Economist of the Bureau of Mines.

| | Domestic Consumption of Gasoline 1919 | 1920 | |
|---|---|---|---|
| January | 169,256,877 | 238,204,518 | |
| February | 185,900,192 | 248,395,214 | Increase: |
| March | 201,004,317 | 256,020,539 | 290,654,414—26% |
| April | 243,440,615 | 297,001,120 | |
| May | 328,277,648 | 378,912,672 | |
| | 1,127,879,649 | 1,418,534,063 | |

As already noted, at least two samples show evidence of being adulterated with kerosene. Four other samples have end points above 475 deg. Fahr., which indicates very careless refining if not actual adulteration. Most of the samples, however, come very close to the average curve. Taken as a whole, the net change in quality is best represented by the increase in the average boiling point of the gasolines. These are of the following order:

| | January, 1920 | July, 1920 | Increase Degrees F. |
|---|---|---|---|
| Chicago | 270 | 275 | 5 |
| San Francisco | 262 | 270 | 8 |
| New York | 261 | 272 | 11 |
| Washington | 267 | 279 | 12 |
| Salt Lake City | 270 | 286 | 16 |
| Pittsburgh | 257 | 275 | 18 |
| New Orleans | 254 | 285 | 31 |

(*Continued on page* 583)

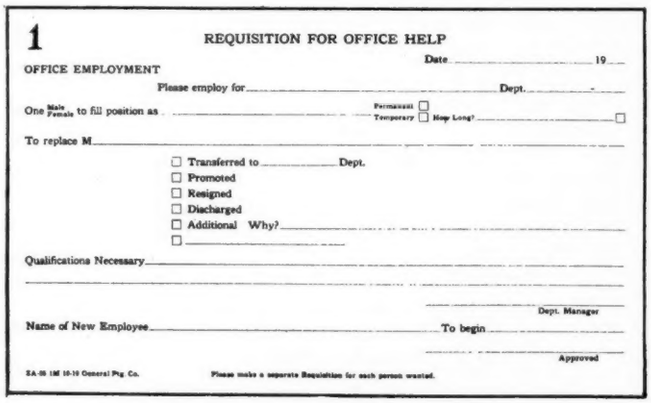
# Employment Department Increases Efficiency of Office Personnel

**Personnel and employment work as applied to the office is not as widespread nor as highly developed as similar work in connection with manual workers. Valuable results have been obtained, however, by applying effective personnel methods in office work at a large automobile plant.**

By Norman G. Shidle

As an organization grows in size it becomes increasingly difficult to control overhead expense in the office. Inefficient workers, too many workers at one task, red tape, favoritism and kindred evils creep in and increase expenses. To meet this need the office employment department, analogous in purpose and function to the factory employment department, has been installed by many concerns. Methods of office employment management, however, have not been as fully developed in most places as employment practice in relation to manual workers. Since proper office employment methods are essential to effective reduction of overhead — an administration feature especially prominent just now—an examination of the methods at a plant where valuable results have been obtained is of interest. The methods developed at the Packard Motor Car Company embody some interesting features.

When an office employee is needed, the head of the department in need fills out the form shown in Fig. 1, "Requisition for Office Help." The information on this form indicates to the office employment department the type of employee desired, together with the reasons for hiring him. Thus the employment department has a check on every department as regards the hiring of new men and the causes which necessitated their hiring. The employment department is a part of the office manager's staff. In this way the task of co-ordinating the work of the various departments is under one head, and the information gained on these requisition cards is of value in checking the efficiency and methods of the various departments.



1

REQUISITION FOR OFFICE HELP

Date ..... 19...

OFFICE EMPLOYMENT

Please employ for ..... Dept. .....

One Male / Female to fill position as ..... Permanent ☐ Temporary ☐ How Long? ..... ☐

To replace M .....

☐ Transferred to ..... Dept.
☐ Promoted
☐ Resigned
☐ Discharged
☐ Additional Why? .....
☐ .....

Qualifications Necessary .....

Dept. Manager

Name of New Employee ..... To begin .....

Approved

EA-55 1M 10-19 General Prg. Co. Please make a separate Requisition for each person wanted.

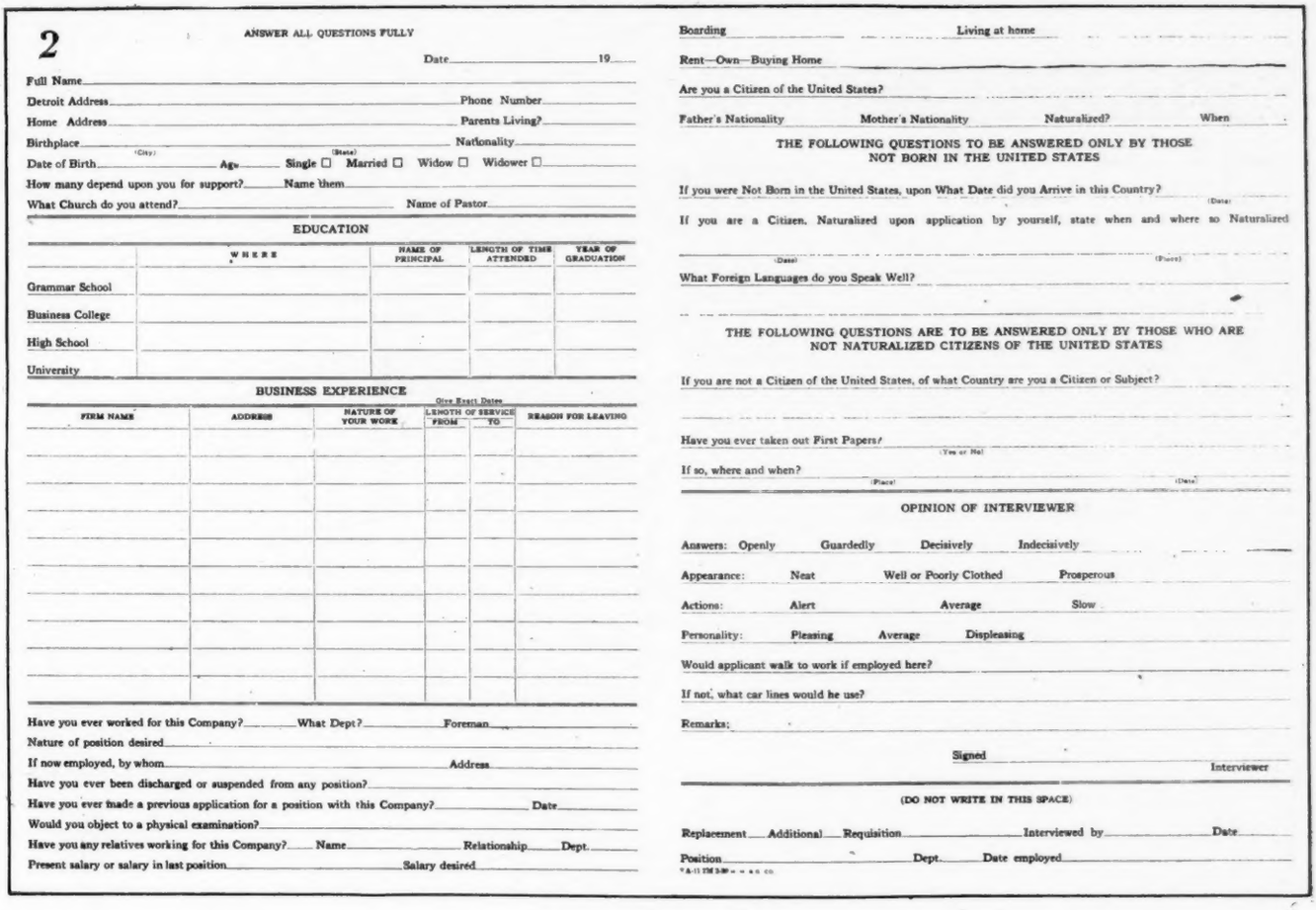
*Fig. 1—Requisition for office help*

A space is left on this requisition in which the department head may indicate what he considers the necessary qualifications for the job. In many cases, however, the employment department has already been provided with a job analysis, which enables him to know exactly the duties and necessary qualifications of the new employee.

When the applicant for a position comes to the plant he is ushered into the employment office and comfortably seated across the desk from that official. A courteous reception is given to even the most unlikely looking applicants, an interview is granted them, and, if unavailable they are sent away in a pleasant manner. The physical surroundings of the employment office, while not in any sense elaborate, are dignified and comfortable. Every effort is made to have the applicant feel at ease. In this way two results are achieved: unsuccessful applicants go away with goodwill for the organization and successful applicants enter upon their duties with a feeling of enthusiasm. The courteous greeting received when they were asking for a position makes them enter the organization with a favorable impression; an important feature in getting started right. The creation of such an impression is effectively handled by the office employment department in a way that it could not be by separate department heads.

When the applicant has been interviewed, he is asked to fill out the application blank, illustrated in Fig. 2. This blank is self-explanatory and follows largely the form of similar blanks used in other organizations. At the end of the usual questions, however, space is given for the opinion of the interviewer. This is valuable in the case of applications which are filed away and referred to at a later date. When a position is open, and the application files are consulted, the opinion of the interviewer is available in concrete terms and render the choosing of the best man for the position much less of a guesswork job than if the employment interviewer were to rely merely upon his memory for this information.

The "Departmental Record and Personnel Report" shown in Fig. 3 is a form novel enough to bear special comment. A part of this form is filled out by the applicant just after he has been hired. He is asked to grade himself upon certain qualities, all of which are of importance as regards his business success. A little careful thought and speculation upon the information thus gained goes far toward determining fundamental traits in the character of the new employee. Much can be ascertained regarding the possibilities of the new man through a study of that man's estimate of himself. The man that goes through this form uniformly marking himself "1" in every desirable characteristic is likely to be either egotistical or incapable of self-analysis and thought. He is not likely to realize his own weak points, and will probably be difficult to criticize. On the other hand, a man whose self-analysis shows the results of careful thinking and ability to analyze his own defects is likely to be able to analyze other less difficult



2

ANSWER ALL QUESTIONS FULLY

Date ..... 19....

Full Name .....

Detroit Address ..... Phone Number .....

Home Address ..... Parents Living? .....

Birthplace (City) ..... (State) ..... Nationality .....

Date of Birth ..... Age ..... Single ☐ Married ☐ Widow ☐ Widower ☐

How many depend upon you for support? ..... Name them .....

What Church do you attend? ..... Name of Pastor .....

EDUCATION

| | WHERE | NAME OF PRINCIPAL | LENGTH OF TIME ATTENDED | YEAR OF GRADUATION |
|---|---|---|---|---|
| Grammar School | | | | |
| Business College | | | | |
| High School | | | | |
| University | | | | |

BUSINESS EXPERIENCE

Give Exact Dates

| FIRM NAME | ADDRESS | NATURE OF YOUR WORK | LENGTH OF SERVICE FROM | LENGTH OF SERVICE TO | REASON FOR LEAVING |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Have you ever worked for this Company? ..... What Dept? ..... Foreman .....

Nature of position desired .....

If now employed, by whom ..... Address .....

Have you ever been discharged or suspended from any position? .....

Have you ever made a previous application for a position with this Company? ..... Date .....

Would you object to a physical examination? .....

Have you any relatives working for this Company? ..... Name ..... Relationship ..... Dept. .....

Present salary or salary in last position ..... Salary desired .....

Boarding ..... Living at home .....

Rent—Own—Buying Home .....

Are you a Citizen of the United States? .....

Father's Nationality ..... Mother's Nationality ..... Naturalized? ..... When .....

THE FOLLOWING QUESTIONS TO BE ANSWERED ONLY BY THOSE NOT BORN IN THE UNITED STATES

If you were Not Born in the United States, upon What Date did you Arrive in this Country? (Date) .....

If you are a Citizen, Naturalized upon application by yourself, state when and where so Naturalized

..... (Date) ..... (Place)

What Foreign Languages do you Speak Well? .....

THE FOLLOWING QUESTIONS ARE TO BE ANSWERED ONLY BY THOSE WHO ARE NOT NATURALIZED CITIZENS OF THE UNITED STATES

If you are not a Citizen of the United States, of what Country are you a Citizen or Subject? .....

Have you ever taken out First Papers? (Yes or No) .....

If so, where and when? (Place) ..... (Date) .....

OPINION OF INTERVIEWER

Answers: Openly Guardedly Decisively Indecisively .....

Appearance: Neat Well or Poorly Clothed Prosperous .....

Actions: Alert Average Slow .....

Personality: Pleasing Average Displeasing .....

Would applicant walk to work if employed here? .....

If not, what car lines would he use? .....

Remarks: .....

Signed .....
Interviewer

(DO NOT WRITE IN THIS SPACE)

Replacement ..... Additional ..... Requisition ..... Interviewed by ..... Date .....

Position ..... Dept. ..... Date employed .....

*Fig. 2—Application blank*

problems in an effective manner. A little consideration of this subject opens up wide possibilities for speculation as a result of this self-analysis by the new employee.

In an adjacent column the department head is asked, some six months later, to give his opinion of the employee as regards those same characteristics. A comparison of the two estimates is very valuable in determining the possible ultimate value of the man to the organization and in making raises in pay, etc.

This particular form was developed in the office employment department at Packard and indicates an interesting line of thought in several directions. Much valuable information can be obtained from the form as now constituted, but it would seem altogether possible that the ideas embodied in it might be carried even further in the development of similar work elsewhere.

Before entering upon his active duties, every office employee undergoes a thorough physical examination, the results of which are recorded at the top of the form illustrated in Fig. 4. Following this is a brief personnel record of the employee, which is kept in the files of the employment department. On the reverse side of this card is the name and address of the employee, together with the date on which he started to work, the rate of pay he received at that time, and a record of all subsequent increases in pay.

On the "Employees Record Card," illustrated in Fig. 5, appears all the information in regard to the employee necessary for the proper administration of the employment department work. This includes the usual information concerning education, business experience and past record. In addition there appears an analysis of the employee's habits and characteristics as regards punctuality, accuracy, personal appearance, dependability, interest, initiative, courtesy, loyalty and disposition. While these characteristics are abstract and incapable of being estimated with absolute accuracy, a general impression can be recorded which is of great value in judging the worth of the employee.

Since the task of the office employment department is not only to hire new employees, but also to keep them at work in the most effective manner, to see that every employee is satisfied and working enthusiastically, the matter of wage increases must also rest in his hands. When a department head desires to increase the pay of an employee in his department, he fills out the "Recommendation for Change in Rate" card, shown in Fig. 6. This card is sent to the office employment department and is approved by the office manager.

The form shown in Fig. 7 is sent by the employment manager to the head of the department when an employee's rate has been raised. This serves to have the employee informed ahead of time that a desired increase has been granted, to ease his mind, and to make him work with more concentration than would be the case if he were wondering whether or not he were to get his raise.

Because of illness or some other unexpected financial demand of a similar nature, employees sometimes ask for advances in pay. Such advances are granted when, in the judgment of the employment manager, they are justified. In such cases the form shown in Fig. 8 is filled out and signed by the department head, the employment manager, and the chief timekeeper. The employee can then draw the advance in pay from the paymaster's department.

The methods described here have been gradually built up at the Packard company during the last fifteen months, and a marked improvement has been apparent both in labor turnover among office employees and general office effi-

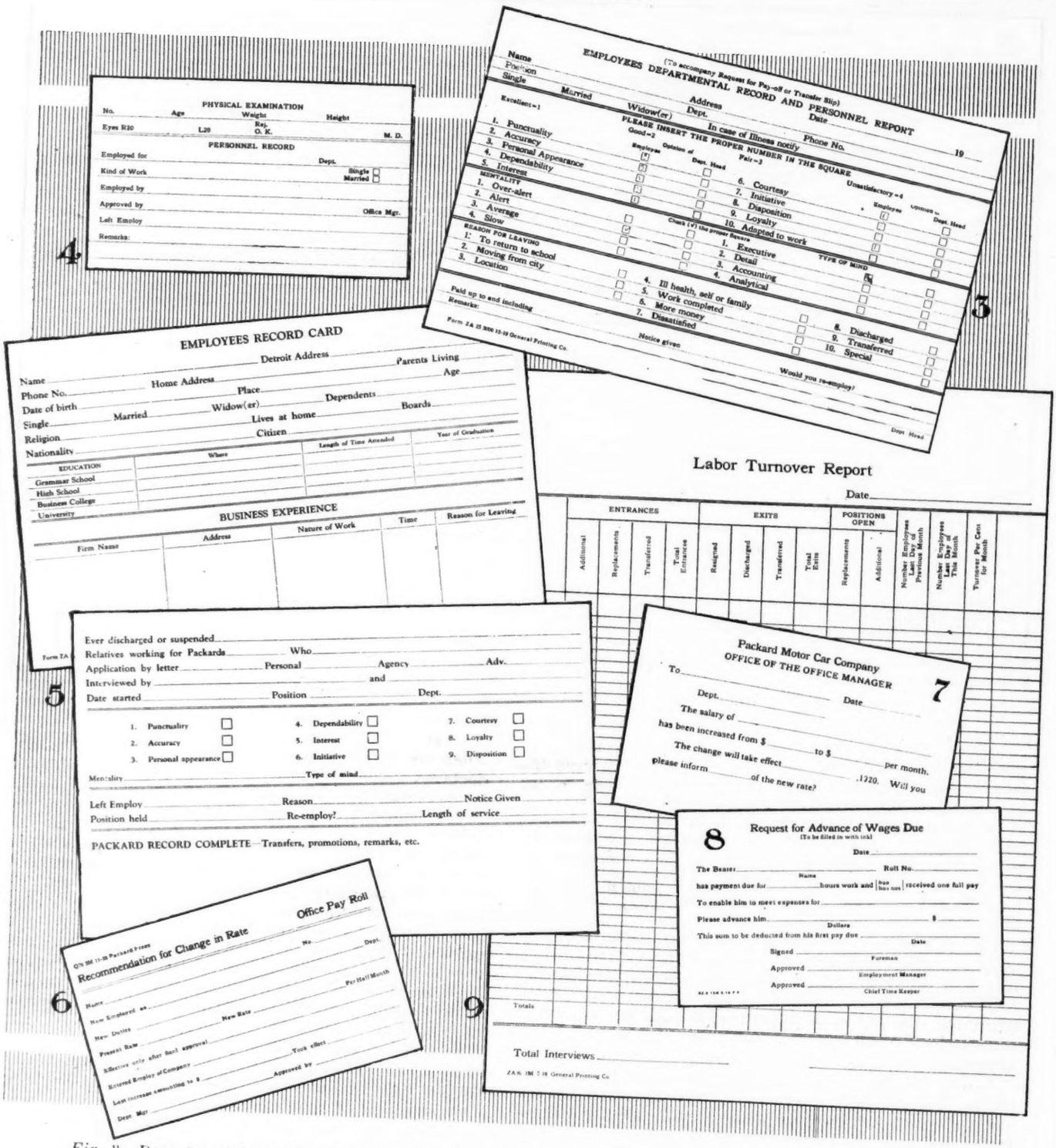



*Fig. 3—Departmental record and personnel report. Fig. 4—Physical examination and personnel record. Fig. 5—Employees' record card. Fig. 6—Recommendation for change in rate. Fig. 7—Notification of increased salary. Fig. 8—Request for advance of wages due. Fig. 9—Labor turnover report*

ciency. While rather wide powers are necessary if the office employment department is to operate effectively, this power is never exercised arbitrarily. There is the closest possible cooperation between the employment department and the department heads, the work of the one in selecting employees and keeping them satisfied being supplemented by the council and advice of the other in judging the efficiency of the work and the justification of advances both in pay and position. An applicant for a position of any importance is always interviewed and approved by the department head as well as the employment interviewer before being definitely hired. In this way the greatest possible efficiency has been obtained in the handling of office personnel work.

Careful labor turnover reports are kept each month on a form similar to the one shown in Fig. 9. The average turnover in the office force for the last six months has been about 5 per cent monthly, a record which surpasses that of years previous to the installation of effective office employment methods.

# Failure in the Publication of House Organs

**The life of the average house organ is said to be two years. Many factors go toward accounting for the high rate of failures; one of the most important is suggested by this article. The editor of the house organ must be big enough to be admitted to the entire confidence of the management.**

A PROMINENT publicity man stated recently that the average life of a house organ is about two years. There are, of course, numerous exceptions, but this statement is probably true in the main. It is reasonable to suppose that, when a house organ is discontinued, the management considers that it has failed to achieve its purpose and that it has not justified its right to existence. What, then, constitutes a successful house organ, and why do house organs fail?

House organs are usually run for one of two purposes; as incentives and aids to the sales force or as means of securing the good-will and co-operation of the workers in a plant. The successful attainment of either of these goals is a difficult task; a task calling for a continued application of gray matter and for a vast amount of constructive thinking by the person in charge of the venture. The publication with the latter purpose, however, probably faces the hardest problems in present-day industry.

The story of the rise and fall of a particular plant organ, which began with every chance of success that money and backing could give it is interesting in connection with a study of the problem.

The entrance of the United States into the great war caused a certain large industrial plant, which employed about 12,000 men, to be built up in the eastern part of this country. It was constructed from nothing, but the men in charge were determined to spare no expense in the matter of "welfare" work and other methods of gaining the enthusiastic co-operation of the workmen. The record of how large sums of money were spent in this "welfare" effort, with far more liberality than intelligence, belongs to another chapter. As a corollary to that work, however, a weekly plant paper was established some six months after production had begun. An experienced publicity man took charge and was paid about $3,000 a year. He was a man of excellent intelligence and considerable experience in publishing work. The staff consisted of the editor and two assistants.

**As to the broad purpose for which the paper was being published, as to the aims the management had in mind, as to the big problems of industrial relations which the paper was to help solve, the staff was not informed or expected to know. If they did have any ideas on this subject, the management did not know it; certainly the management did not talk the matter over with them. It gave them money and said, "Go to it."**

And throughout the stormy journey of the sheet, there was but little close contact with the management and but little attempt to edit the paper along any definite path in line with any definite policy. The editors were enthusiastic, understood newspaper work, and knew how to write news that would interest the men. They were handicapped, however, by too lengthy and too numerous contributions "from above," or by order of "above," which, though supposedly of educational value, were probably never read. Taken all in all, however, the paper was fairly good—a good ship sailing without a compass.

Now, any ship sailing in that fashion can go on only so long. The winds toss it about and it is likely at any time to strike a rock. So sailed this weekly plant organ. The war ended.

Turning to a reorganization for peace-time production, the management began by cutting all expenditures to a minimum, reducing the force and economizing in every way possible. One of the first measures of economy was the elimination of the house organ.

In one sense this paper had been a success, that is, it had received the approbation and compliments of the management and workers during its whole existence, but when the real test came, the test of utility, it was tacitly declared a failure when no appropriation was made for its continuance.

The course of this house organ is typical of many others in both peace times and war times. Many seemingly successful house organs have failed to meet the fundamental test which will always be applied when anything like "hard times" arrives: "Is it a real aid to production?" No house publication can meet such a test unless the man in charge of it is taken sufficiently into the confidence and counsel of the heads of the firm to enable him to understand thoroughly and effectively interpret their policies.

**Many house organs fail because the management expects to get a $5000 job done efficiently by a $1200 man. But many others fail because a thoroughly competent editor is expected to accomplish his task without the opportunity to keep closely in touch with all those points of company policy which are essential to an intelligent and successful administration of his organ. Any newspaper man can fill a number of pages each week with "bunk," possibly with rather entertaining "bunk," but such an organ cannot meet the final test. A real plant organ of a large organization should be handled by a man whom the management considers big enough to be admitted to its highest councils.**

Though he receives a larger salary commensurate with his ability, such a man at the head of the plant organ means a saving in the long run, for his work will be a real factor in increased production and efficiency throughout the plant.

# Gas Engine Builders Hear Plea for Organization

**The reasons for organization and the fundamentals of an organization that does things were forcibly presented at the annual meeting of the National Gas Engine Association. This topic and that of standardization held the interest at the session participated in by various officers of the S. A. E.**

LESSONS of organization that can be applied to your business, the advantages of standards and the necessity for developing the highly efficient and economical stationary gas engine, the methods by which the standards become common property, the necessity of the adoption of oil standards by the industry; these are the chief topics considered in the papers presented at the joint session of the National Gas Engine Association and the Society of Automotive Engineers at the thirteenth annual convention of the first named body.

In the discussion of organization, George Wrightman of the L. V. Estes Co., Inc., laid down the fundamentals of organization, gave many good examples that could be taken home and put to work in your own organization and pointed out the possibility of a national business men's association for stabilizing conditions in this country.

Organization, he said, is a band of men, not banded together, but linked together to perform a duty that is too big for one individual to do. Organization demands first of all a man for every place. The man must be fitted for his position, and above all things must be loyal.

At this point he explained what is meant by the "disease of organization." When the private interests of an individual in an organization are placed above public service and the individual makes use of the organization to further his private interests, then you have "disease" of organization, which is the most prominent factor of failure. In order to have an organization and to be in business, enough of a product must be sold to make the business worth while. In order to guarantee deliveries, it is necessary that production be kept up to the level of sales. The last and probably most important is that the product must be made at a profit.

There are certain things in an organization that should be watched, and probably the most important is leaking at the joints. The statement was made that organization is a band of men linked together. For this reason it is very necessary that all lost motion between joints be eliminated as nearly as possible.

Organization is not in numbers but in body and soul. What is the purpose of organization? Why have an organization? There are two very common reasons and purposes for which every organization has been formed. The first, defense or fear; the second, fun. Defense is the factor which holds an organization together and is the factor which will either make or break an organization.

There are three classics illustrating organization. One ancient and the other two modern. About 3000 years ago there was an old man whose sons were continually quarreling and the old man wished to give them a good lesson that would bring them together. He took a bundle of sticks and wound them together with a cord. He then called in his sons and handed the bundle to each one in turn, requesting them to break it if they could. After all of them had failed the old man took the bundle, unwound the cord and handed a single stick to each son, which they broke very easily. This is the first example we have of organization.

If you will look at the back of the 1920 dime you will see this bundle of sticks, which is representative of the statement, "United we stand, divided we fall."

One of the more modern examples is that of the warden in an insane asylum who stepped into one of the wards where there were several big, husky men and ordered them about. A friend of his said, "Some day those fellows are going to get together and mop the floor with you." The warden's reply was, "If they could get together they wouldn't be here."

Perhaps the best example we have of organization is the bee hive. No one ever heard of a strike in a bee hive. The queen bee doesn't go out and get honey, and furthermore she has five or six other bees sitting around feeding her all the time. However, she has a specific duty to do which she carries out perfectly and which is acceptable to all the bees in the hive.

Two other factors, which are of great importance in organization and which are very closely linked together, are instruction and ideas. Every part of an organization should have the instructions that will enable it to carry out the particular duty assigned in the most efficient manner possible. Ideas are essential in keeping an organization alive and working. The New York Life Insurance Company advertised that they would give $25,000 to any individual who could furnish an idea that could be put to use in their organization. This is an open statement which seems to indicate that they feel perfectly sure that their organization is almost perfect and should anyone furnish an idea that can be used successfully in their organization they will be repaid many times for that one investment of $25,000 for the idea.

The last factor, which carries probably as much weight as any of the others, is personal acquaintance. This factor is, of course, more adaptable to a large association of business organizations rather than the business organization itself.

The fundamentals and basic rules of organization as outlined in this talk are applicable to any type or form of organization whether it be large or small. Take our own government, for instance. It is the largest and only organization of its kind in the world. Isn't it organized primarily for defense? It is, and furthermore, it is organized on the principle of giving the people of this country law, order and protection and leaves the people alone to work out their own salvation.

If your organization is to weather the storm of present conditions and conditions that are to come, it will be necessary to make a careful analysis of every detail in your business. Don't forget to consider all the men, from the

president to the office boy. Don't forget that the man in the shop with soiled hands, overalls and a cap, no matter how minor a position he may occupy, may have some gray matter under that cap that will be well worth your consideration and be a help in perfecting your organization.

If you have a big man in your organization, make him feel that he is a big man by supporting and helping him in every way possible. If you don't do this, and he is a big man, he will leave you and go elsewhere. If he isn't a big man he will stick with you, and that is the kind of a man you don't want. In closing Wrightman stated that he believed the most logical way to stabilize conditions in this country is through a National Business Men's Association and he believes that within a very short period of time such an organization would be formed.

Coker Clarkson, General Manager of the Society of Automotive Engineers, who spoke in the place of J. G. Vincent, President of the Society, on the question of standardization of the automotive industries, gave a definition of the term standard. A standard facilitating, he said, is an adoption of a specification that can be applied to the greatest advantage for practical usage without impeding individuality and engineering progress. Statements by some of the prominent automotive engineers of this country show that it aids the reduction of manufacturing costs. The term standard has caused considerable confusion and is misunderstood in many cases. A standard is not positive or final, but is flexible and is for the purpose of facilitating manufacture and production and consequently cost reduction.

In the field of the stationary gas engine, there is a great possibility for the development of a more efficient engine. As an example a stationary gas engine has recently been constructed in England for such work as driving a small dynamo. This engine is a 4 x 6 in. bore and stroke, single cylinder developing 6 hp. at 750 r.p.m. This engine was run for 100 hours with a 6 hp. output during the entire run and consumed about ½ pint of fuel per horsepower hour. This is considerably less fuel consumption than most engines of the same type and size are giving and on this basis it was estimated that the saving in fuel per year would amount to $65.

The Science of Standardization, which was presented by Robert S. Burnett of the S.A.E., outlined the beginning of automotive standardization, the classes of S.A.E. Standards, the routine in establishing standards and the workings of the American Engineering Standards Committee.

William F. Parish, technical director, lubricating department, Sinclair Refining Co., in his talk on oil specifications pointed out the necessity of oil standards. Parish was the chief of lubrication for the United States Government during the war and many of the facts brought out in this paper are based on war records and clearly point out that certain things which were said to be impossible were worked out to a high state of efficiency.

R. L. Welch, secretary and counsel, American Petroleum Institute, gave some interesting figures on oil production. The latest figures compiled this month show that we are producing oil at the rate of 453,000,000 barrels per annum, and using it at the rate of 437,000,000 barrels. In 1911, we produced 700,000 barrels of oil or 315 barrels per motor vehicle. In 1919, we produced 7,568,848 barrels of oil, or 50 barrels per car. The increase in car production had been 979 per cent while the increase in oil production has been but 71 per cent. This clearly illustrates how the automotive industry has pulled away from the oil producers. In analyzing the situation, the question arises as to why there has been such a fluctuation in the price of crude oil and the amount produced.

When the price of gasoline was at its lowest ebb, which was about 11 cents per gallon, figures show that the number of new oil wells drilled dropped clear down. Why? Because the price of crude oil was so low that it didn't pay to drill. When the price of crude went from about 65 cents to $1.20, the number of oil wells drilled immediately came up to where it was the year previous to the low prices. One of the things which should make us feel particularly cheerful over the situation is that the month of August shows a new record for the number of new wells drilled. There were 3,513 wells brought in, which is the highest number on record in the history of the oil industry in this country.

### Farm Lighting Specification Standards

A membership of fifty-one firms was reported at the meeting of the "Isolated Plant Manufacturers' Section," and the name of this section was changed to "Lighting Plant Section." The session of this section, the newest of those connected with the Association, was devoted to the adoption of standard specifications. The following is a summary of the report:

Farm light plants divided into three classes—

1. Those furnishing power from generator alone.
2. Those furnishing power from generator and battery combined or from battery alone.
3. Those which furnish power from battery and generator combined or from either battery or generator alone.

The following cell equipment is recommended for plants:

For 32-volt service, 16 cells lead type or 24 cells Edison type.

For 60-volt service, 32 cells lead type or 50 cells Edison type.

For 110-volt service, 56 cells lead type or 92 cells Edison type.

Generators are to be rated in watts, but the manufacturer may publish a supplementary rating in amperes or lamps of a specified wattage.

Plants furnishing power from generator alone are to follow the recommendations laid down by the Electric Power Club. (These recommendations are confined to sizes of shafting, pulley, speeds, nomenclature, ratings for different kinds of service and other industrial matters.—Editor.) For the other classes above mentioned, it is recommended that for 32-volt service, the generator rating be 36 volts at full load and that the temperature rise from continuous operation at that voltage shall not exceed 50 deg. Cent. on windings and 65 deg. Cent. on the commutator. For 60-volt service the generator shall be based on 72 volts at full load for continuous operation and for 110-volt service the generator shall deliver 125 volts. Other temperature limits are suggested and the tests are to be made with the generator assembled in the complete unit with the battery disconnected and the load to consist of lamps or other resistance.

The engine horsepower is to be the brake horsepower at the rated speed available at the generator shaft and when a power pulley is provided, the horsepower available at the pulley shall be given as the brake horsepower at the rated speed when the generator is supplying no load.

The only point on which the convention was unable to come to an agreement was the question of battery ratings. There was considerable discussion as to the advisability of using the 8-hr. or intermittent method of rating and this question was left to the committee.

The following officers were elected for the coming year: President, H. G. Heidt, New-Way Motor Co.; Vice-President, Fred Tubbs, Alamo Farm Light Co.; Treasurer, Otto M. Knobloch, Splitdorf Electrical Co.; Directors, E. M. Ford, Webster Electric Co.; L. M. Ward, Cushman Motor Works.

# The Political Significance of the Labor Trend in Europe

**A study of the objects and attainments of the various strikes, especially in England, since the signing of the armistice, point to the ambitions of the labor leaders to keep the government interfering in industry to pave the way for labor participation in this reconstruction period.**

By Harry Tipper

IT is interesting at this time to consider the labor situation in the European countries and the progress which has been made toward a more peaceful condition in industry. Belgium has suffered less from economic disputes than the other industrial countries in Europe during the last few months, and the principal trouble in that country is due to the shortage of labor which still continues.

Since the recent events in which the plans of the radical labor leaders were frustrated by the failure of the strikes and the general attitude of the people, France has had a greater measure of freedom from industrial disputes and a general settlement toward a better efficiency of production.

The good harvests in these countries have improved the outlook from the standpoint of food and the absence of serious industrial interruption has gone a considerable distance toward bringing about a better trade condition. There is some disturbance over the eight hour law, which was put into effect in France not long after the cessation of hostilities. The employers complain that this law was prematurely enacted and that it has curtailed production and limited the efficiency of labor so that the effective production is not being secured with the present shortage.

There is an agitation for a repeal of this act or its modification, and whatever may be the value of an eight-hour day theoretically, **the general effect of this law has been to reduce the actual amount of work which can be secured from a given number of men at a time when labor is scarce and production is very urgently required.**

Conditions in Great Britain continue to be disturbing. There is no cessation in the demands of the labor unions for increases in wages, and the more powerful bodies among these unions are aggressively backing their demands on the plea that the cost of living has risen more rapidly than the increase in the wages.

Because of the general slackening in business and the financial outlook, these demands are not being conceded so readily by employers, and in some cases, the disputes have led to periods of idleness which have threatened to become protracted.

> **The power of the labor unions is so great in some lines of industry and is increasing to such an extent that it is not possible for the employers in such lines to resist the demands of the labor unions without the alternative of shutting down entirely. In these cases union demands have been the subject of discussion, and increases have been granted because the power has been transferred from the employers to the unions and they are forcing their advantage.**

It is interesting to note, for instance, that the agricultural workers, who were practically unorganized before the war, have been organized to such an extent that they have been able to enforce increases in wages from the farmers, who have notoriously resisted any attempts from such a character previously. In fact, for years the agricultural laborers in Great Britain were paid on a scale much lower than that pertaining to similar classes of work in industry.

Without respect to the justice of the matter, this point indicates the rapidity with which previously unorganized trades have become strongly organized and sufficiently well led to press demands in a field where they have been successfully resisted heretofore. It is evident, from the attitude of the coal miners in their demand for an increase and their attempts to dictate the price which shall be paid by the domestic consumer of coal, that this organization has not given up its program of nationalization and is using its power to keep the coal question before the public and in politics so that the nationalization program may be furthered by this continual and insistent demand for attention.

It is further evident that this organization and organizations in the steel and other large branches of industry in Great Britain are well disciplined and present a solidarity that suggests the possibility of great political changes in the future.

Some time ago the Industrial Court which was established on the basis of the Whitely system refused increased wages in the engineering trades. The metal trades unions have given notice that they will withdraw from the Industrial Court and have instructed their executive leaders to find some other method of dealing with wages. It is probable that this action will be welcomed by the employers also, and that the whole system of direct negotiations with the unions will take the place of the present unsatisfactory machinery.

Perhaps the most important development in the trade union field in Great Britain was the action of the leaders in connection with the Polish situation. It is obvious from the unanimity of this action, and the fact that the moderates were the spokesmen therefore, that the British labor power is intensely interested in the political questions before the country, and is also quite interested in the international development of labor union strength. It does not mean that British labor has any love for the Bolsheviki or any angreement of the Bolshevist program. It does mean, however, that the labor leaders determined that no part of their economic power should be directed to the maintenance of the present system of capitalism,

which they have decreed is unsatisfactory to them and which they have stated must be changed.

**While they are not willing to subscribe to the Bolshevist movement and have held aloof therefrom, they are not willing to move against it, because it is a movement of the working classes and consequently a movement which they will not lend their power to fight.**

It is entirely probable that the actions of the labor party with the accession of power and the increasing solidarity of labor with respect to its aims will force a general election in Great Britain, and it is not at all improbable that in the event of such an election, Great Britain would find itself with a labor majority and a Cabinet dominated by the labor forces.

As a consequence of this, the immediate effect of the present industrial difficulties of Great Britain upon the commercial situation for the world's trade is of minor importance. While it is true that the British worker has not come back to his pre-war efficiency as they have in Belgium and in this country, the temporary difficulties in which the industrial owners find themselves due to these causes are of little concern in comparison of the political situation. It is true that wages have arisen to such an extent that costs can only be maintained upon a competitive parity by an improvement in the individual efficiency of the worker, and in this respect the industrial production of Great Britain is at a disadvantage compared with the pre-war period.

It is evident, however, that the accretion of power to the labor unions and the intimate concern of labor leaders with politics, has occupied the attention of the British working population to the exclusion of industrial matters except as they further the political aims. It is not likely that there will be any notable increase in the per man efficiency of output until the political situation is more definitely established and the power which the workers have secured has been charged with a concomitant responsibility in connection with political matters.

The power of the labor party as a political force is too great to permit confining its disputes to industry and its objects to industrial matters of a temporary character. Few of these strikes have been concerned entirely with industrial matters. **Wages, limitation of profits, etc., have been the text of the demand, but it has not required much examination to indicate the political nature of the movement and the intention of keeping government interfering in industry to prepare the way for the introduction of some of the items contained in the platform of the labor party for reconstruction.**

What is done in Great Britain will have a much larger influence upon the tendency of labor organization work in other countries than the radical development of the Bolshevist movement. It is important, therefore, to watch the development of the situation in that country and particularly the political character of the actions taken and their probable effect upon the governmental policy of the country.

The revolution which is proceeding in Great Britain, in the shifting of industrial power, is too important and too far reaching in potentialities to permit of its proper analysis at the present time. Without very much disturbance, and with a surprising amount of trade development, the consolidation of labor power and the control of industry by labor organizations has been going on at a rapid pace since the armistice.

**When this change begins to define itself in political action, we are likely to be amazed at the distances which have been covered in the political life of Great Britain by this shift in political power and this boldness in the attempt to secure the demands of this great political working class party.**

The recent occurrences in Italy, in which factories in whole districts have been seized by the workers and run under communistic plan, because of disputes between the workers and employers, indicates the degree to which the workers' aspirations have been inflamed in Europe by the events of the war and the post war period. It is not without significance that the Italian government has made no attempt to enforce the orderly respect of property and has stood aloof from this seizure. It is obvious that they fear the effect of any attempt to turn this into a political question and prefer to watch its progress as a matter of dispute between the workers and employers of particular industrial establishments.

The progress of events in Europe economically and politically in the development of labor organizations and labor relations will be worth watching and the tendency of these events in the different countries will not be without its reflection upon the different racial interests in this country, who still retain a considerable interest in the development of the countries from whence they have come.

# Motor Gasoline Survey by Bureau of Mines

(*Continued from page 575*)

TABLE 2
Averages from Table 1

| District | Date | First Drop | 20% | 50% | 90% | Dry | Aver. B. P. |
|---|---|---|---|---|---|---|---|
| New York | Jan., 1920 | 121 | 204 | 256 | 354 | 418 | 261 |
| | July, 1920 | 132 | 210 | 263 | 373 | 432 | 272 |
| | *Difference* | +11 | +6 | +7 | +19 | +14 | +11 |
| Washington | Jan., 1920 | 125 | 200 | 255 | 381 | 439 | 267 |
| | July, 1920 | 131 | 200 | 273 | 396 | 449 | 279 |
| | *Difference* | +6 | same | +18 | +15 | +10 | +12 |
| Pittsburgh | Jan., 1920 | 100 | 182 | 256 | 375 | 425 | 257 |
| | July, 1920 | 128 | 196 | 263 | 400 | 454 | 275 |
| | *Difference* | +28 | +14 | +7 | +25 | +29 | +18 |
| Chicago | Jan., 1920 | 116 | 199 | 262 | 381 | 445 | 270 |
| | July, 1920 | 142 | 203 | 259 | 399 | 455 | 275 |
| | *Difference* | +26 | +4 | —3 | +18 | +10 | +5 |
| New Orleans | Jan., 1920 | 128 | 206 | 258 | 354 | 424 | 254 |
| | July, 1920 | 138 | 223 | 280 | 383 | 445 | 285 |
| | *Difference* | +10 | +17 | +22 | +29 | +21 | +31 |
| Salt Lake City | Jan., 1920 | 113 | 204 | 266 | 386 | 440 | 270 |
| | July, 1920 | 126 | 212 | 279 | 406 | 456 | 286 |
| | *Difference* | +13 | +8 | +13 | +20 | +16 | +16 |
| San Francisco | Jan., 1920 | 130 | 212 | 258 | 347 | 406 | 262 |
| | July, 1920 | 124 | 214 | 264 | 362 | 428 | 270 |
| | *Difference* | —6 | +2 | +6 | +15 | +22 | +8 |
| All districts | Jan., 1920 | 119 | 200 | 259 | 369 | 427 | 264 |
| | July, 1920 | 130 | 208 | 268 | 388 | 456 | 277 |
| | *Difference* | +11 | +8 | +9 | +19 | +29 | +13 |
| Federal specifications | Nov. 25, 1919 | 140 | 221 | 284 | 374 | 437 | ... |

The average boiling point also indicates which cities are obtaining the most satisfactory gasoline. From this standpoint San Francisco is first, with the average boiling point of 270; New York is second, Pittsburgh and Chicago are tied for third place; Washington, New Orleans and Salt Lake City follow in the order named.

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TO protect aluminum and aluminum alloys from corrosion, a German inventor has tried the experiment of browning the metal electrolytically. The aluminum is suspended in an electrolyte consisting of a sulphur compound of molybdenum, and zinc is used for the anode.. The cell is maintained at a temperature of 60 deg. to 65 deg. Cent. The aluminum is soon covered with a dark brown coating. The metal may be bent or rolled without cracking the coating. A piece of aluminum thus coated is said to have been immersed in a salt solution for two months without showing the slightest trace of corrosion.

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# Half Century of Aerial Mail

THE fact that the aerial mail service between New York and San Francisco was started this week has recalled that 50 years ago this month the first aerial mail service was instituted. This service was from beleagured Paris and was conducted by free balloons. It is admitted that it is a far cry from the attempt to send mail out of Paris by balloons to the ambitious project of sending mail regularly across the North American continent by airplanes, but a few years ago the Paris date was frequently referred to as an indication of the possibilities.

It was in 1911 that demonstrations of airplane mail service were made in the United States, England and India. Since that period the development has been rapid, although many of us who have become accustomed to wartime speed in carrying out projects are inclined at times to assert that the several governments have been very slow in applying the aerial developments of the war to peace time pursuits.

The very fact that the starting of this transcontinental mail service supplied the average citizen with something of a thrill, is evidence that the work is more or less experimental. But at that, it is doubtful if the pilot who makes this trip has as exciting experiences as some of the balloonists did 50 years ago. Certainly the pace makers who made this trip recently did not. The lapsed half century has been one of remarkable progress.

# The Extravagant Car

THERE is a type of car which is extravagant. It is a luxury because it is needlessly uneconomical. We refer to the car which is never driven more than 20 miles per hr., which never leaves the city streets, but which, at the same time, is equipped with an engine of 60 to 80 hp. In all our large cities we have several examples of this type of car. They are cars which do nothing but carry the owners to the shops or theater. They never leave the boulevards, they are never driven in excess of city speeds, which are limited to 20 miles per hr., and most of the power utilized is due to transporting their own weight and not the weight of their passengers.

There is not an engineer in the automobile industry who does not know that a car for this purpose could be designed which would readily travel 30 miles to the gal. of gasoline, which would go 35,000 to 40,000 miles on a set of tires, which would be just as easy riding, just as quiet and just as comfortable as the more heavy unit now employed. In other words, a car could be designed for city streets not to travel over city speed limits, which would readily perform all of the functions desired and give the owner the utmost in comfort and satisfaction both as regards its reliability and its economy.

Such a car would probably have a maximum speed of 30 miles per hr. It might be equipped with more than a three-speed gearbox and could be, if desired, made with almost as long a wheelbase as the heavy car. The wheelbase would not have to be as long for the passenger capacity because more space would be devoted to the body and less to the engine. The flexibility desired could be secured through the gearset and it is very well possible that engineers could design an automatic shift which would make the operation of this car a simple and easy proposition and not one which would require continual manual shifting.

If the time has come to economize on fuel, it is now time that a light, high quality vehicle be designed, with at least as much weight given to economy as to other qualities. A car of this kind would represent a lower initial cost and at the same time its maintenance would be much lower than anything which has been produced in the automobile line in this country. In Europe we have seen cars which approximate the type suggested, but in this country we have always designed our cars with the idea of adapting them for long distance trips over all sorts of roads. The car suggested would not do for touring. If a man wanted to tour, he should have a touring car besides the one suggested, but it would suit the owner who only uses

his car in the city, over city streets and at city speeds. Were a car of the type described available, it would pay him to own two cars.

## Steering Gear Lubrication

NOW that so much attention is being given to improved methods of chassis lubrication, we hope engineers will not neglect the steering gear. The worm gear shaft of steering gears, especially on the lower priced models, usually has only a single bearing, which it seems to be especially difficult to lubricate effectively. Although the bearing is made of quite liberal size, both as regards diameter and length, it usually wears very quickly, and the gear then develops an annoying backlash. A car with a "loose" steering gear is very unpleasant to drive, especially on narrow roads and in crowded thoroughfares, as it cannot be held steadily to its course.

It has become customary to provide full worm wheels instead of gear sectors, to permit of compensating for wear of the teeth by turning the wheel through a quadrant, but most of the wear seems to occur at the single bearing of the wheelshaft, owing to lack of lubrication.

Practically all steering gears at present have grease lubrication, and the chief supply of lubricant for the worm wheel shaft comes from the gear housing. But owing to the considerable length of the bearing and the very slight motion of the shaft, the lubricant has very little chance of working through to the outer end of the bearing. As far as this bearing is concerned, oil lubrication with some dependable method of feeding the oil to it would certainly be an improvement.

A few high class steering gears are made with anti-friction bearings on the worm wheel shaft. If these are of the adjustable type they can be set up so there is no shake in the shaft. That anti-friction bearings are not used any more extensively for steering gears is probably due to the fact that these bearings are generally looked upon chiefly as means of reducing frictional losses. It is not this feature of the bearings that would count in their favor in a steering gear, but rather their ability to operate satisfactorily even though not supplied with lubricant.

## 535,000 Freight Cars

SHIPPERS and receivers of freight are appealed to by the United States Chamber of Commerce to add 535,000 freight cars to the railroad equipment instantly. In a recent appeal to its membership, the Chamber says that investigations have shown that to meet the present shipping situation the railroads require greatly increased equipment as to cars, locomotives and yard and track terminals. For two very good reasons, a lack of ready capital and the physical limitations of the building possibilities, these demands cannot be instantly met.

So the railroads and the shippers must do the best they can. If the shippers, by loading more heavily and unloading promptly, will supply for traffic the 535,000 cars, the problem of the railroads will be greatly relieved. To buy this many cars in the market, at present prices, would cost $1,605,000,000. So it can be seen if the shippers can provide, by better use of the existing equipment, this number of cars for active traffic they will do a great deal to relieve the situation and leave the railroads in much better shape to provide for their needs in other equipment.

The figures mentioned are obtained from statistics as to the movements of the average freight car. It is found that a car is in the hands of the shipper and receiver 37 per cent of the time, 43 per cent in moving from loading or unloading track to terminal, 11 per cent in train moving from one terminal to another, and 9 per cent laid up for repairs.

An analysis of these figures, applied to the number of cars available, indicate that without waste in either loading or unloading, the 535,000 cars, or the equal, would be added to the efficiency of the present stock of cars.

Such an appeal was made to shippers during the war and, when backed by a patriotic sentiment, worked wonders. Now if the shippers will do as much for their own business and that of their neighbors, as they did to save the country, they can again consider themselves patriotic.

## New Form for an Old Question

AUTOMOBILES, as is so often the case, was the topic in a party met in a social way for the evening. One of the leaders in a conversation was a man who is much engaged in financial problems in a large western city. He was the only one in the party who classed the passenger car as a pleasure vehicle.

The conversation turned to street railway strikes and this man was among those who told how business was kept going despite a public utility strike; and he rather boastfully told of his use of his own car in getting his office force to work and to their homes. Then one of the party asked him:

"Which could you best get along without, the street cars or the automobiles?"

"I hadn't thought of it in quite that way," was his reply, and then he was thoughtful for a long time.

NEARLY every program for industrial relations that has been drawn up within recent years has contained a statement, either expressed or implied, that the "golden rule" should be the basis of such relationships. A lack of practical suggestions for carrying this admirable principle into effect, however, has been one of the chief characteristics of the discussions on this subject. Consequently, business men and manufacturers are now inclined—not without justification—to assume a rather bored expression when a speaker begins to dilate upon this theme.

The "golden rule" is still as correct and workable. Its practical application cannot be achieved, however, without a long period of study into the fundamentals of human relationships, human reactions and human desires. The moral principle holds good under all conditions, but its practical application calls for conscientious analysis and experiment.

# Industry Rallies Needed Support

## Financial Backing Induces Confidence

### Passage Through Readjustment Now Practically Assured—Parts Makers Co-operate

NEW YORK, Sept. 14—Bankers and financiers have the utmost confidence in the future of the automotive industry and they will see that funds are provided to meet the essential needs of substantial companies. They are becoming more and more confident that the country will come safely through the readjustment period.

Business men who were prepared for an emergency or who took advantage quickly of the ominous signs in the early spring will be doing business as usual when something like normal conditions are restored, which may be this fall but is more likely to be next spring. They will be doing well, however, if they pay expenses until the tide turns.

There still is business for manufacturers but they will have to pursue it to its lair and not wait for it to come out into the open. An era of competition has returned. Producers who want to make sales must study the business chart as carefully as a mariner looks for a breeze. Conditions throughout the United States are "spotty." In some sections sales opportunities are legion and they are the ones in which operations should be pushed.

**Must Seek Out Buyers**

Dealers and merchants also have opportunities open to them, although they are circumscribed more or less in their operations. They must get off the beaten track and must study their fields. They must seek out the persons who have money to buy. Then they must study the needs of these potential purchasers and sell according to these needs.

The automotive industry, as has been stated before, is no worse off than many other lines of trade and its plight is far better than some. The outlook is not rosy but there is no occasion for wallowing hopelessly in a slough of despond. So far as manufacturers are concerned, comparatively few of them have adequate supplies of cash. Many of them are paying bills with trade acceptances or notes. All of them are working down their inventories, however, and getting the money out of them as rapidly as possible.

One of the gratifying signs of the times is the spirit of co-operation which is apparent throughout the industry. Each element seems eager to help every other element. The parts and accessory makers are willing to extend every credit extension ordinary business prudence will permit. Only when the outlook is hopeless do they believe a company should be thrown into the courts. It is significant that the Bethlehem Motors receivership was forced by the banks against the wishes of the merchandise creditors. This is by far the most important which has resulted thus far from financial and business conditions. The Standard Parts receivership can be attributed only indirectly to these causes.

**Few Failures in Industry**

Persons inclined to undue pessimism should not forget that there have been comparatively few failures in the automotive industry. Under the circumstances the showing made has been remarkable. There undoubtedly will be others but there is little likelihood the total will be as large as the crepe hangers predict.

Financial disaster is not likely to overtake any of the large companies, although it is highly probable there will be readjustments and consolidations. Maxwell-Chalmers is a case in point. The bankers have too much involved to pocket their losses and let the companies break up.

It is not to be denied that the depression in the industry is discouraging after the unprecedented prosperity which it has enjoyed. There has been a very heavy falling off in production and it is now estimated at from 35 per cent to 50 per cent of normal. A conservative estimate of the number of workers laid off by truck and passenger car manufacturers, parts and tire makers, places the number at 100,000 and the total is almost certain to be larger before the depression ends. This has permitted a readjustment in the status of labor with accompanying changes in wage scales. It is reported a downward tendency already is apparent.

**Living Cost Must Drop**

There can be no return to normal until the cost of living goes down and economists agree there can be no marked decline in the commodities in every day use until abnormal wages are adjusted. There is indisputable evidence that the great mass of the people of the country are determined to buy only absolute essentials until they can see a price level which they consider fair. This determination is less evident in the automotive industry than in many others, however, for dealers in almost every section of the country report a slow but steady increase in retail sales. If a wise and energetic sales policy were pursued it is likely the same would be true of trucks.

Summing up the situation to-day there is no occasion for calamity howling. It isn't by any means as good as it was six months ago, but it might be much worse.

## Parts Makers Open Credit Convention

### Motor and Accessory Manufacturers' Committees Review Existing Trade Conditions

CLEVELAND, Sept. 16—Subjects of interest and importance to the entire industry will be discussed at the fourth annual credit convention of the Motor and Accessory Manufacturers' Association, which opened this morning at the Hotel Statler. The visitors were welcomed to the city by Mayor Fitzgerald, and a general review of the automotive industry, as well as the association's activities, was given by M. L. Hemingway, general manager of the organization. C. A. Burrell, manager of the credit department, told how that branch of the association is helping the industry meet the existing situation.

Present conditions and the future prospects of the industry will be taken up at this afternoon's meeting, which will be a joint session with the Advertising Managers' Council. The principal speaker will be W. P. G. Harding, governor of the Federal Reserve Board, who will speak from the standpoint of the banker. Other speakers will be F. C. Gilbert, president of the Vulcan Motor Axle Co., who will speak from the standpoint of the parts and accessory manufacturer, and E. S. Jordan, who will speak for the manufacturer. Other phases of the subject will be considered from the viewpoints of the raw material producer and the dealer.

**Discuss Important Subjects**

To-morrow morning's program follows: "Advantages of Group Membership to the Credit Men," Roy S. Harvey, secretary and treasurer of the Iron City Products Co.; "Trade Acceptances, Their Use and Abuse," R. E. Hayslett, treasurer of the Hydraulic Steel Co.; report of the Credit Service Committee of the M. A. M. A., by Sidney S. Meyers, general counsel. This report will recount the invaluable activities of the credit department since the financial situation became serious. To-morrow afternoon will be devoted to a general discussion of subjects of interest as well as business conditions.

The annual dinner and dance will be held this evening. The program for the entertainment of the women who are attending the convention has not been announced, but they will be guests of the association.

The Credit Service Committee is composed of Charles H. Burr, treasurer of S-K-F Industries; J. M. McComb, as-

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# Better Business Signs Increase

## Trade Conditions on Upward Trend

### N. A. C. C. Reports Show Market for Passenger Cars Better Than Expectations

NEW YORK, Sept. 11.—Reports from all sections of the country received by the directors of the National Automobile Chamber of Commerce at their meeting here yesterday indicated a more or less general easing of the credit situation. While there has been a marked improvement in only some districts, there is an unmistakable tendency toward easier money.

General trade conditions, the reports indicated, are better than might be expected, and the trend is upward rather than downward. This is especially true of retail sales of passenger cars. The truck market is spotty. In some sections it is good and in others it seems to be non-existent. On the whole, however, the reports were distinctly encouraging with the outlook bright for a fair business for the next 60 days. The reports were compiled by dealer organizations thoroughly familiar with conditions.

Following is a picture of the situation as presented to the directors:

**Salt Lake City**—General automotive trade conditions are quiet in Idaho, Wyoming and Nevada, but are improving in Utah. The wholesale passenger-car market is slow, but retail sales are better than they were. The truck market is showing signs of life, with good prospects for the next two months. The credit situation is relaxing.

**Boston**—General trade conditions are fair, but curtailment has resulted from the financial situation. The credit situation has eased very little, and small-town bankers have shut down entirely on automobile loans. Conditions in other lines of manufacture are very poor.

**Topeka, Kan.**—General trade conditions are good. The wholesale passenger car market is fair and the retail is good. The truck market is excellent. Credit conditions are gradually getting better. Dealers' chief complaint is inability to get cars.

**South Dakota**—General conditions are bad, with little doing in sales of passenger cars and trucks at a standstill. This is due to the refusal of banks to make loans. The credit situation is worse than at any time. Other lines of business also are below normal.

**Memphis, Tenn.**—Trade generally is slower at this time of year on account of the crops. The passenger car market is below normal and the truck market is dull because of difficulty in financing sales. Little improvement is expected before November.

**Atlanta**—The trade generally has suffered a considerable slump but shows signs of improvement. The passenger car market is showing new life, and prospects are bright for trucks. Credit is easing.

**Shreveport, La.**—General conditions are somewhat improved. There has been a noticeable change for the better in the retail passenger car market. There is no wholesale market. The truck market is poor on account of the slump in cotton prices. Credit has eased very little.

**Harrisburg, Pa.**—Passenger car sales are falling off and trucks from two tons up, sold on lease, are being turned back. Banks will loan to reputable dealers in small amounts.

**Binghamton, N. Y.**—General conditions are only fair, and the passenger car market is slowing up. There has been no easing of credits.

**Indianapolis**—General conditions are satisfactory, and the better class of truck dealers are doing a good business. Dealers have had very little difficulty in regard to credit.

**Des Moines**—General conditions are only fair, and the passenger car market is much below 1919. Trucks are away below normal. Credits are easier.

**Portland, Ore.**—General trade conditions in the State are good except in eastern Oregon, where they are poor. Passenger car sales are about 50 per cent of normal and truck sales 75 per cent. The credit situation is decidedly bad. It is estimated there are 2000 cars and trucks in storage in the State. The gasoline supply now is normal.

**Seattle, Wash.**—In general trade is about 50 per cent of the average for the last three years but there is no truck market. There is a little easing of credit. The gasoline situation is much improved.

**Sacramento, Cal.**—Trade conditions in northern California are good. Sales of standard passenger cars and trucks are good. Credits are easier. The gasoline supply has become normal.

**Charlotte, N. C.**—Credit pressure has eased materially, but there are many freight cars loaded with automobiles unloaded in North and South Carolina.

### FUEL SUPPLY NOW NORMAL

NEW YORK, Sept. 11—The gasoline supply throughout the country now is normal, according to reports received by the directors of the National Automobile Chamber of Commerce here yesterday. This is true even on the Pacific Coast, where there was a serious shortage for 60 days. While the supplies are adequate to meet the needs, the prices are higher and in many sections are tending higher than they have been.

## Truck Managers Aim to Increase Sales

### Will Urge Extraordinary Methods to Seek Prospects—Banks to Lend Aid

NEW YORK, Sept. 13—Various angles of the problems which are presented to them in these days of industrial uncertainty were discussed by members of the National Association of Motor Truck Sales Managers at a conference Friday and Saturday at the National Automobile Chamber of Commerce. The theme nearest their hearts was how to increase sales.

Various means of overcoming sales resistance were considered, and many suggestions along this line were offered. One of the main purposes of the organization is to stress the essentiality of the truck as a means of transportation. Progress was reported in connection with the proposed advertising campaign along this line.

The credit situation was taken up in more or less detail, and the sales managers told of conditions as they concern their companies. Addresses were delivered by two New York bankers, who declared that banks were ready to finance to the limit of their ability all legitimate sales of motor trucks. They said they recognized their importance as an agent of transportation.

It was agreed that a buyers' market has returned, and that extraordinary efforts must be made to seek prospects who can be sold. Every company is preparing to undertake an intensive selling campaign. One of the first things to be done in this connection will be to weed out salesmen who are not producing results in actual sales.

## Cadillac Eliminates Distributer Allowance

DETROIT, Sept. 13—Faced by an increased production cost, necessitating an increase in car prices, the Cadillac Motor Car Co. has decided to curtail the graduated quantity allowance to distibuters.

This action was taken at the request of the distributers, who, at a conference late in August, told the factory officials that they would rather lose the allowance than have to sell the cars at increased prices. The allowance was an arrangement between the Cadillac Motor Car Co. and the distributers, based on the volume of business done by the distributer.

The distributers' 20 per cent, which has been in vogue at all times, has not been reduced.

# Detroit Gains on July Production

## Most Plants Show General Increases

### Cars Exceed Trucks in Strides Toward Normal Business—Ford and Hupp Lead

DETROIT, Sept. 12—Passenger car production in automobile factories in Detroit territory totaled 150,573 in August as compared with 147,299 in July. Truck production also showed an increase of close to 3000, the August production reaching 18,080 as against 15,468 in July.

The output of trucks by the Ford Motor Co. alone prevented a much poorer showing for August, Ford's total being 12,368 compared with 9251 in July. The Ford increase of 3117 more than offsets the deficit shown in the month's production in other factories.

Buick officials sounded a note of optimism when they declared the industry already was beginning to recover from the set-back. Buick orders and estimates, they said, justified the production increase of 2000 cars in August, and September is expected to show an even better percentage increase.

Ford, with a production of 83,556 cars, increased his July total by only 294 cars, while the Dodge August figures show an increase of 1000.

Ford factories during the coming fiscal year will be devoted to reaching a production of 1,225,000 cars, necessitating a daily output of over 4000. The factory got away to a good start, and as yet has not fallen below the 4000 mark since Sept. 1. On Sept. 3, 4116 cars were built, 4239 on Sept. 4 and 4179 Sept. 5. In addition to the greatly increased car and truck output the Ford factory turned out 10,387 tractors in August.

**Reo Hangs Up New Mark**

Reo Motor Car Co. hung up a record with the August production, the factory turning out 1315 cars and 2000 trucks. The truck record was an increase of approximately 1000 over July.

In the truck end, General Motors, Packard and Federal showed an increased production in August. With the other factories, however, there was a noticeable slump. Republic, which closed down during the last ten days of August, built only 340 trucks, as compared with 1240 in July. Oldsmobile truck output was 200 under July, while the Paige output was cut one-half. Denby and Acme also slumped in August production, as did Transport.

At the General Motors plant executives said despite the feeling of depression the company's August output was greater than that of July by reason of the fact that materials and supplies could be secured more rapidly and steadily.

On account of reorganization efforts, and the consequent closing of the Maxwell plant no Maxwell trucks were turned out during the month. At the Federal truck plant officials are outlining plans for an intensive sales campaign in the confident belief that the crest of the slump has been passed, and that business rapidly will get back to normal in point of demand.

**See Good Fall Business**

Federal executives who made a trip to Eastern cities and West as far as Kansas City declared dealers are optimistic and see prospects for a good fall and winter demand. Orders are said to be coming in the factory in gratifying numbers, many of them, of course, for export account. Although there are few trucks at the factory the statement was made to-day that there was not an unsold truck on hand.

Officials of the Acason and Denby companies express enthusiasm over the future prospects, and while their outputs were curtailed in August, indications are, they said, that the break for the better plainly would be evident about Oct. 1, and from that time on continued improvement would mark the industry.

In the passenger car end the Hupp Motor Car Corp. forged to the front as the leader in point of increased production, with an output of 2270 cars in August compared with 1500 in July.

President Hastings said despite the general note of pessimism there was no slacking in Hupp demand except from the foreign field, where various factors intervened. The regular monthly notification to distributers as of Aug. 25, Hastings said, brought replies from 60 per cent, everyone of whom, with one exception, wanted from 50 per cent to 100 per cent more cars than they were alloted. Hupp officials set their August mark at 2500 and strove manfully to reach that record, but were interrupted by the break in the Detroit Edison company's service, which necessitated a three days' shut-down.

**New Models in Production**

Buick and Studebaker factories have settled down to a steady production on new models, and both plants showed an increase of 2000 cars for the month. At the Studebaker-Detroit plant it was said the dealer organization was in splendid shape, financial affairs were in good condition and dealers generally wanted extra cars.

Packard Motor Car Co. kept up its normal production, while the Cadillac fac-

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## Working Plan Drawn for Standard Parts

### Will Continue Operations During Refinancing Stages—Principal Creditors Extend Claims

CLEVELAND, Sept. 11—Out of a series of meetings held the last two days by committees representing the creditors and stockholders of the Standard Parts Co. has come a formal agreement that means the salvation of Cleveland's great accessory manufacturing establishment. It has been definitely decided that the company will continue in business as usual, although plans for refinancing have not been formulated.

Work on this plan will be continued until one which is satisfactory to all the elements involved has been worked out. It is expected an agreement will be reached next week. There is no probability that the one which resulted in the filing of injunction suits by L. H. Perlman and other minority stockholders will be settled upon. Injunctions were granted by Judge Westenhaver restraining the sale of $8,000,000 in 8 per cent notes to retire $6,000,000 in 6 per cent notes now outstanding and also the issuance of 80,000 shares of new stock. If these steps were illegal before the receivership it is not considered likely they would be otherwise construed now.

At the close of an all-day session today, the announcement was made by Cyrus Eaton, chairman of the joint committees which have been working to untangle the financial knot in which the company has been tied, that the principal creditors of the company had agreed to co-operate by extending their claims and by continuing to supply the company with necessary material.

**Books Show Profits Made**

The receivers and the former management have made a complete show-down of the company's books to creditors and they found nothing in them which was not reassuring. Money has been made in the last few months, and figures were produced to show that creditors would have nothing to lose and much to gain by co-operating for a reasonable time.

The opinion prevailed at the meeting of creditors that they should help the stockholders protect their equity in the property. This equity was placed at approximately $10,000,000.

Eaton said the common stockholders have agreed to subscribe an additional substantial sum. At the creditors' meeting the opinion was expressed by Fred H. Goff, president of the Cleveland Trust Co., that the receivership can be lifted within 30 days.

# N. A. C. C. to Act on Production Limit

## Dealers Would Fix Output to Demand

### Fear That Market Will Be Glutted Brought to Attention of Factory Heads

NEW YORK, Sept. 13—Telegrams were sent to-day by Alfred G. Reeves, general manager of the National Automobile Chamber of Commerce, to the individual members of the organization asking their views on an urgent message from the National Automobile Dealers Association suggesting that manufacturers keep their production within the limits of sales possibilities. Whether or not concerted action will be taken in this direction cannot be determined until the replies are received.

The message from the N. A. D. A. was prepared after an emergency meeting held in Chicago late last week to discuss the motor car situation. It expressed the views of representative dealers and distributers from 23 States. They were virtually unanimous in the opinion that the industry is in a safe position, but that it has returned to a buyers' market and that the financial conditions are "critical."

It was decided that unless production is limited to actual demand for cars, the market will be glutted, the financial condition of the sales end of the industry will be weakened and price cutting will be made possible and even necessary. The dealers reported that many cars already are in the hands of banks and finance companies for re-sale, having been turned back by the persons who purchased them.

The association decided to wage a general campaign among dealers, urging them to obtain more working capital and intensify their sales efforts. It was reported that banks in some sections still are discriminating against automobiles, and that money is tight almost universally. Because of this fact it was held winter stocking of cars would be difficult.

**Must Consider Year as Total**

Discussing the telegram, Reeves said:

"Manufacturers and dealers must view these last three or four months with the previous nine to show a year's business before saying they are being ruined. The financial situation is serious for the automotive industry as for all other industries, but it is not critical except for those concerns which have over-expanded. Manufacturers constantly have advocated increased capital for dealers, and will heartily endorse any step in this direction. Most dealers are doing too big a business on too little money. It is probable there is no other line which has as big a turnover in proportion to the capital invested.

"In an interview I had to-day with Vice-President Sisson of the Guarantee Trust Co., he told me that money is tight for everybody. Several other industries are much worse off than the automotive. Credits will continue to be tight for some time to come, and he does not expect a very marked easing before the first of the year. The automobile manufacturers feel the readjustment will all be for the best provided no one loses his head.

**Need Bank Representation**

"The industry never will get the credit and the financial standing it deserves unless it works from the inside, which means that more manufacturers and big distributers take their places on bank directorates. If the industry were more widely represented in the banks it could make a better fight for its rights. The banks are in the automobile business, but automobile men, generally speaking, are not in the banks.

"Manufacturers feel that by the time it is necessary to stock cars for the winter the credit situation will be somewhat relieved and that normal stocks can be carried. Ours is becoming more and more a year round business. It seems quite likely manufacturers will keep production within the limits of demand. No manufacturer wants to ruin the market.

"This is a matter of individual judgment, and as the manufacturers are men of sound judgment it is not likely they will do anything detrimental to the distributers and dealers and the market. We are working in close co-operation with the National Automobile Dealers Association, and their thoughts on this subject have been sent to all the manufacturers."

### REPUBLIC TO MERGE PLANTS

YOUNGSTOWN, Sept. 13—Reports current in financial circles that a part of the reorganization of the Republic Rubber Corp. included the sale of the Canton properties where the Knight and Blackstone tires are produced, were not denied by officials of the Republic Rubber Corp. this week. Information obtainable from the office of the Republic company was that "the announcement would be forthcoming in due time."

It is understood that the reorganization plans call for intensive attention to development of the Republic products in the Youngstown plant and centering all interests here. While the sale of the Canton property would bring a substantial amount of capital to the financial resources of the company, it is believed that this is not the motive in disposal of the Canton plant.

## Tire Sales Fall Off in Summer Months

### Factories Attribute Drop to Overstocking Last Fall Against Price Raises

AKRON, OHIO, Sept. 13—Sales of automobile tires by manufacturers to dealers were far below normal during June, July and August. This was partly due to the fact that during last fall and winter dealers stocked up very heavily and the severity of the winter in many sections of the country retarded sales by reducing the use of cars. This had the effect of overstocking. Another factor in the overstocking with the dealers was their heavy buying during the winter in anticipation of an increase in price during the spring months.

With the manufacturers the impression prevails, based on reports from agencies, that these stocks are now gradually moving and, except in cases where dealers stocked too heavily, the time is at hand when they will require replenishment to meet the consumer demand.

In this connection the manufacturers are of the opinion that the outlook for sales, both by dealers and manufacturers, should be good, especially in the next four months, for the reason that September, October and a part of November represent a fair per cent of the automobiling season.

One of the largest manufacturers reports that while collections from charge customers by tire dealers have been slow they have not been in greater proportion than is experienced by dealers in other commodities, and this concern adds that it should be remembered that there has apparently been no curtailment in the use of automobiles, and as long as this is the case there will continue to be a big demand for tires.

### AWAIT BETHLEHEM AUDIT

NEW YORK, Sept. 13—Plans for the refinancing and reorganization of the Bethlehem Motors Corp., which is now in receivership, are being held up pending a complete survey of the company's affairs and a thorough audit of its books. No definite steps will be taken either by the committee representing the bankers or the merchandise creditors committee until this work is completed but it is probable a joint session of the two committees will be held next week. There is reason to believe adequate funds will be provided for the continued operation of the plant. Several additional changes are contemplated in the personnel of the management.

# Mexico Increases Demand for Cars

## Prosperity Seen in Growth of New Car Business—Continue Tariff Exemption

LAREDO, TEXAS, Sept. 13—That business and industrial conditions of Mexico are much improved over what they have been for several years is shown by the increased demand for automobiles, according to dealers here and at other border towns. While most of the automobiles now being shipped to Mexico are of the used variety, sales of new cars are being made under promises of delivery as quickly as possible. It is stated that the exemption of automobiles from import duties which was decreed by the Carranza Government and perpetuated by the present Government will be continued indefinitely.

It is asserted by men who have investigated the possibilities of Mexico as a market for automobiles and motor trucks that it is a most inviting field for these lines of trade. This is especially true as to motor trucks. In some instances the adoption of motor trucks by mining and industrial concerns have already solved local transportation problems, and there are thousands of other plants which are similarly in need of the vehicles. The lack of railroads in Mexico accentuates the need of motor trucks. This is true as to all parts of that country, it is asserted. In the petroleum fields of the Gulf coast region, adjacent to Tampico, many motor trucks are now in daily use. They perform an important service in the industry.

The chief reason for the comparatively few purchases of automobiles by people in Mexico during the last several years is that there was an uncertainty as to whether the car would ever reach its destination, and even should it come into possession of its buyer there was no guarantee that some army officer, revolutionist or bandit would not take it into his head to confiscate it for his own use. It was a common practice for public officials and army officers of the Mexican Government during the régime that intervened between the late President Porfirio Diaz and President Adolfo de la Huerta to take over from private owners automobiles that may have caught their fancy.

### Confiscations Hurt Market

In the City of Mexico hundreds of automobiles that were there were confiscated in this manner. In the more remote cities and towns most of the private owned automobiles were taken possession of by military men of one faction or another until the market for new cars was practically obliterated, with the exception of such orders as were placed in the United States by the Government and army men.

The demand for used cars which could be purchased in Laredo, San Antonio, El Paso, Eagle Pass and other towns on and close to the border at comparatively low prices held up remarkably well. These automobiles were shipped to the larger cities of the country, where their unsightliness did not appeal to the discriminating taste of the public officials and army men and therefore were safe from confiscation.

Along with the improved business and industrial conditions of the country comes the news from the City of Mexico that the Government is having surveys made for a number of new and modern highways that are to be constructed at the earliest possible moment. It is planned that trunk highways shall be built from the City of Mexico to Laredo and to ports of Vera Cruz and Tampico; also that the roads in the mountains and more remote districts shall be built and improved so as to accommodate automobile and motor truck traffic.

# Argentina to Build System of Highways

NEW ORLEANS, Sept. 13—The Good Roads Association of the Argentine Republic, backed by Minister of the Interior Gomez, and given every possible aid by the Argentine Government, has been organized with approximately 3000 members, according to Dr. A. B. Minares, of Buenos Aires, who is in New Orleans placing his two sons in Loyola University here.

"Argentina is in need of good roads," said Dr. Minares, "since the remote and highly productive agricultural districts are not touched by the railroads, and Americans in the Argentine, led by S. T. Henry, a road-building engineer, of New York, have succeeded in interesting the government and people in improved highways. Minister of Interior Gomez has taken hold of the project from the government end, and some 3000 men, mainly property owners, in all parts of the country have joined the association. Even the railroads are supporting the project, and have offered to transport road-building machinery and materials at very reduced rates, since the improved highways would act as feeders.

"Plans for a system of roads crossing the comparatively level country in all directions have been mapped out. It is understood that the national government will put up one dollar to every two dollars put up by the various cantons (states) and by the people, through bond issues or other means. American methods of raising money and of road construction will be followed."

### PREMIER STOCKHOLDERS SIGN

INDIANAPOLIS, Sept. 13—Prospects are bright for the refinancing of the Premier Motor Corp. Holders of 69 per cent of the notes which are due Nov. 1 and which the company has announced it will be unable to pay, have consented to a plan to retire the present issue with a new issue of 7 per cent notes which will run for five years. It will be necessary to obtain the consent of only 75 per cent of the noteholders to assure the success of the plan.

# Payment by Exports Kills Czech Market

## No American Cars Shown at Prague International Exhibit —Dealers Seek Change

WASHINGTON, Sept. 13—Automobile dealers in Czecho-Slovakia find it almost impossible to develop a market for American cars under the present economic policy of the government, according to a special report received here to-day from Vladimir A. Geringer, trade commissioner at Prague. The Twelfth International Automobile Exposition which was staged Aug. 8 at the Prague Fair Grounds illustrated the difficulties under which dealers must conduct their business. Of the 150 passenger cars of all types not one American model was on exhibition.

The economic policy adopted by the Republic of Czecho-Slovakia requires the payment for cars imported under special license must be made in exports of goods manufactured in that country. Special licenses are issued to dealers only after proof has been submitted that the payment would be made in steel or other materials used in the manufacture of automobiles. One of the leading dealers in Prague has been exchanging window glass for complete cars.

The exposition was staged through the efforts of the Czecho-Slovakia Automobile Club, which secured special concession to allow manufacturers to bring in cars according to the number of models. The next show has been scheduled for the spring season, when modifications of present restrictions are expected from the government.

Fifty thousand persons attended the exposition which housed 75 stands. Six Czecho-Slovak firms exhibited 20 models of passenger cars, three trucks, two motor plows, three omnibuses and one tractor. There were eight Austrian exhibitors, six German, two French, one Italian and one English. The highest-powered car was a six-cylinder, 70-hp. "Tatra," of domestic manufacture, and the lowest powered car was a four-cylinder, 10-hp. Andrea Citroen. The average price for a four-cylinder, 35-hp. touring car was about 200,000 crowns, which at the present rate of exchange is about $2,000, the crown being worth 2c. The sixes brought about $3,000, and a limousine sold for $4,000. Dealers have large orders on their books, but have little hope for meeting the demand until the economic terms are changed.

### FIRE DAMAGES WILSON BODY

DETROIT, Sept. 10—Fire which damaged the plant of the Wilson Body Co. to the extent of $100,000 to-day destroyed 750 Ford bodies in various stages of construction. The blaze started in the shipping room from an undetermined cause. More than 400 employees were working in the plant at the time, and all escaped save one man, who was killed by an explosion of chemicals.

# N.A.C.C. to Promote Highway Education

## Endorses Courses in Colleges on Engineering and Maintenance at Directors Meeting

NEW YORK, Sept. 11—Decision to promote in every possible way the establishment of courses in highway engineering and maintenance in the colleges of the country was reached by the directors of the National Automobile Chamber of Commerce at a meeting here yesterday. Reports were made by Roy D. Chapin, chairman of the engineering committee, and Pyke Johnson, secretary, of the meeting at Pittsburgh with representatives of the Federal Department of Education and other interests interested in highway development.

The purpose of the chamber will be to lead the entire nation to a complete understanding of the importance of the automobile as a vehicle for road transportation. All the industry has done in the past has been to sell automobiles and the public has not been thoroughly convinced on the theory which lies back of it. The chamber will lead in a campaign along this line.

The traffic report presented to the directors showed a falling off in shipments. In August there were shipped 22,000 carloads of finished vehicles; 7000 were transported by boat and there were 28,000 driveaways. The figures for July were: Carloads shipped, 23,000; shipped by boat, 8700; driveaways, 52,000. It was shown that there has been a marked improvement in general freight conditions. The accumulation of loaded cars has been reduced to approximately 74,000 from about 261,000 last spring. It was pointed out, however, that it undoubtedly will be necessary to continue driveaways and that there is likely to be a recurrence of freight congestion as winter comes on.

President Clifton and General Manager Reeves were empowered to retain all the counsel necessary to combat any effort on the part of the Internal Revenue Bureau of the Treasury Department that manufacturers should pay a sales tax on the retail price of their products when they grant exclusive sales territory.

It was decided to contribute $3,500 to the fund for the erection in Washington of a building for the Chamber of Commerce of the United States.

### To Take Up Export Matters

A meeting of the export managers of all factories having such departments, it was decided, will be held in this city, probably on Oct. 8. At this meeting the whole question of exports will be taken up and it is believed the discussion will evolve ideas which will be distinctly helpful to the industry.

The directors voted to expand the work now being done in the education of bankers, legislators and organizations as to the essentiality of the industry.

The meeting was the first held in the new quarters in the Marlin-Rockwell building and the directors were much pleased with the permanent home of the Chamber. All the directors were present except John N. Willys, who is in Europe, and Horace Dodge. Willys was represented by James E. Kepperley and Dodge by Fred J. Haynes.

The Willys Corp. and the Gardner Motor Car Co. of St. Louis were admitted to membership.

Entry blanks for the New York and Chicago shows were mailed to-day.

## Trucks Make Inroads on Piled-up Steel

YOUNGSTOWN, Sept. 13—Motor truck movements continue to play an important part in the reduction of the piled tonnage of the steel mills of the Mahoning Valley, Accumulation of unshipped finished and semi-finished iron and steel products of the Mahoning and Shenango valleys two weeks ago amounted to 7500 cars, as against 7900 cars the week before and 8500 cars four weeks ago. In addition to movement of the curtailed current production, the warehoused tonnage was also being moved during the last four weeks at a most encouraging rate, although most of this reduction in the unshipped tonnage was largely due to improved rail conditions.

Trucking of tonnage to fairly distant points for rail shipments, and to direct nearby and distant consuming points is being vigorously pushed. The use of motor transportation has ceased to be a wonder in the steel industry and excites little comment in this valley now. It has however demonstrated that the motor truck of general use in this territory was not designed, although effectively adapted, to steel shipments and it is expected that the truck builders who take advantage of this and send their engineers and designers into the territory can develop trucks that will meet the need.

### CASE ADDS NIGHT SHIFT

RACINE, WIS., Sept. 13—Due to the increase in demand for J. I. Case Plow Works Co. products, a night shift was added to the force of day workers Sept. 1.

The problem of moving the vast amount of machinery and transferring the work of the Wallis Tractor unit to the new buildings is now under consideration and the actual moving of the entire Wallis Tractor plant to its new buildings will be started probably within the next two weeks.

### HANSON INCREASES PRICES

ATLANTA, Sept. 14—At a meeting of distributers and dealers held at the factory here a new price schedule was announced by the Hanson Motor Co., to take effect immediately. It follows: Touring car and roadster, $2,365; sport model, $2,465; sedan, $2,885. The somewhat higher prices are attributed to the increased cost of the new style body which has been adopted and refinements which have been added to the Hanson.

# Tabulation Shows Truck Importance

## Hundreds of Freight Cars Being Released Through Activity of Motor Vehicles

CHICAGO, Sept. 13—It would require 86 freight cars three days to transport the materials and supplies carried over the Chicago, Hammond and Gary highway by motor trucks in one day. At least 50 additional freight cars would be needed to transport new passenger automobiles being driven over this highway from the factories.

These figures represent an average day and were compiled by the Travel and Transport Bureau of the B. F. Goodrich Rubber Co., after its 24-hour traffic census taken at a station on the highway near the Indiana state line.

The census shows this road to be one of the most intensely traveled highways in the country. The observers, who have just completed similar checks on exceptional "heavy duty" highways near Pittsburgh, Cleveland, and other centers, say the passenger car traffic was twice as heavy as over any previously checked inter-city highway.

There were 1079 trucks of all classes recorded by the observers, of which 40 per cent, or 437, were empty. This empty truck percentage is slightly higher than that shown at other centers, and is caused by an exceptional number of privately owned trucks rather than public haulage trucks which benefit by the return loads factor. The empty trucks represented a carrying capacity of 1316 tons, and if loaded would release railroad freight cars for other duty at the rate of 18,300 cars per year.

Even the heaviest and slowest moving motor truck can make the round trip between Chicago and Gary in one day, while at least three days each way are required by rail between these same points. In other words, if one day's motor truck tonnage was loaded in freight cars on Monday, delivery could not be expected until Thursday morning, by which time motor trucks would have delivered three times that amount of tonnage. This is not taking into account the motor haulage necessary at both ends of the rail haul between shipper and station and between terminal and consignee.

### Shows Relief to Railroads

The survey graphically illustrates the rôle of the motor vehicle in relieving railroad terminal congestion and the growing use of the motor truck in short-haul traffic.

Highway transportation engineers say motor haulage is in its infancy, and in estimating growth declare that the excellent roadway between Chicago and Gary is strong and wide enough to bear five times its present traffic before the congestion point is reached. When this state is reached this one bit of highway will release 150,000 freight cars annually.

# Expect Clean Sweep in Briscoe Force

## Advent of Wardwell as President Believed to Presage Big Shake-up

DETROIT, Sept. 10—Announcement of the resignation of Jules Haltenberger, chief engineer of the Briscoe Motor Corp., effective Oct. 1, is believed to be the forerunner of a clean sweep to be made in the organization as a result of the induction of H. F. Wardwell as president. The information regarding Haltenberger's resignation was given out by him and confirmed by factory executives, who said the announcement was premature, and that it had been intended to withhold it pending the appointment of a successor, who has not been selected.

Haltenberger has been with Briscoe the last five years, and is the designer of the new Briscoe, the model first shown at the New York show in January. Haltenberger would make no statement regarding the reason for his resignation, and declared he had no plans for the immediate future.

At the factory it was said President Wardwell had entered the organization with the determination to delve deeply into all conditions affecting the plant and make whatever changes were deemed necessary. It was said other changes in the organization doubtless would be announced from time to time, though nothing had been decided definitely along that line. In line with Wardwell's plans W. G. Zeby, formerly connected with the Chicago office of the Michigan Central Railway, has been made traffic manager of the Briscoe organization, and has assumed his duties at the plant.

### FORD DEFENDS ROAD PURCHASE

NEW YORK, Sept. 14—Henry Ford is credited with having saved the Detroit, Toledo & Ironton Railroad from bankruptcy in answers filed in the Supreme Court in the suit brought against the company by minority security holders. It is asserted that 98 per cent of the owners of stock and notes have agreed to the lease to the Ford corporation formed to take over the property. The answer states that the road traverses a territory from which the coal supply has been exhausted and that it has been handicapped in handling other commodities by operating defects and lack of equipment. There have been numerous receiverships in the last 20 years, and the last receiver left an operating deficit of $3,500,000. There was a continued loss in 1916 and 1917.

### DOELGER & KIRSTEN OPEN PLANT

MILWAUKEE, Sept. 13—Doelger & Kirsten, pioneers in the manufacture of alligator shears, and still the only makers of these tools in the entire Northwest, will commence operations in their new works this week. The new plant is 100 x 200 ft., on a site 130 x 250 ft. The concern makes shears in five sizes, ranging from a contractors' shear for cutting reinforcing bars to a tool weighing 43,000 lb., capable of cutting 6-in. rods or rails cold. The range includes a so-called automotive type, which makes a single revolution and stops. This is widely used in forge plants, warehouses, etc. Doelger & Kirsten were established in 1892. The active management and ownership still is vested in Charles H. Doelger and Oscar F. Kirsten.

# Two Refiners Indicted for Illegal Practices

LOS ANGELES, Sept. 13—Indictments charging the General Petroleum Co., one of the largest producers and refiners of oil and gasoline on the Pacific Coast, and the Utah Oil Refining Co., a $10,000,000 corporation of Salt Lake City, with illegal practices in connection with the shipment of gasoline, were returned here Saturday by the Federal Grand Jury. The action resulted from an inquiry conducted by the Attorney General's office following reports that certain railways were giving concessions or rebates on shipments of gasoline and that certain corporations were falsely billing gasoline as crude oil to take advantage of difference in rates.

There are forty-eight counts in the indictment against the General Petroleum and sixty against the Utah Oil. Accusations are based on the Elkins act prohibiting the acceptance of concessions from a common carrier in respect to the transportation of property in interstate commerce. It is charged that the oil corporations accepted such concessions from the Santa Fé and Salt Lake railroads. At the time of the alleged transactions the railroads were under Federal control.

### TO CLEAR DRIVEAWAY ROUTES

NEW YORK, Sept. 14—As the first step in a campaign for snow removal during the coming winter, the Bureau of Public Roads has asked the Highways Committee of the National Automobile Chamber of Commerce to obtain data from its members listing those highways which will carry the heaviest driveaway traffic. It is desired to obtain approximate figures on the amount of such traffic over each road listed. When the information is available the Bureau of Public Roads will prepare a bulletin urging concentration of effort on these highways and the need for doing as much of this work as possible with the funds at hand.

### SAYERS FINISHES NIZZA RUN

CINCINNATI, Sept. 13—The Sayers entry was one of six cars to finish the reliability run from Amsterdam to Nizza, according to information received at the offices of the company here. The car was entered by John Schut of the Amersfoort firm of Klaas Baving, representative of the Savers & Scoville Co. in continental Europe.

# Detroit Factories Show August Gain

## Majority of Plants Make Strides Toward Normal Production —Credits Better

(*Continued from page* 588)

tory showed an increase of 200 cars in August production.

The output of the Jackson Motors Corp. factory at Jackson was curtailed about 20 per cent during August, but officials said improvement was looked for in from 30 to 60 days, with rapid return to normal thereafter. Paige production was off about 20 per cent as compared with the company's peak month.

There was no actual production at the Maxwell-Chalmers plants, which have been closed since late in July, though the company shipped 1500 Maxwell and 500 Chalmers chassis.

Hudson-Essex production was cut materially in August, the decrease, as compared with July, ranging around 1300 cars, in the Essex end. Liberty and Columbia ran close to normal, Scripps-Booth reported an increase of 200 over July, and King was cut about 25 per cent. Oldsmobile production also was off about 25 per cent, and no cars were built at the Nelson plant, which will be out of production until November.

Bankers in Detroit, as well as those in nearly all sections of the country, according to reports of dealers, are showing an inclination to take care of all good risks. In this connection an address was delivered at a convention of 400 Ford dealers, representing the Detroit district, which includes parts of Ohio and Indiana, by W. A. Perry, a leading banker of Kansas City.

Perry said it was the most natural course for banks to pursue, to frown upon the long-time installment plan of selling cars to persons not financially able to handle them, the dealers themselves unable to finance the deal, and the banks in consequence called upon to tie up immense sums. Similar statements are reported from a Ford dealer convention at Milwaukee.

### Banks Support Good Risks

The bankers are quoted as reporting conditions much easier, with banks big and little ready to finance any safe dealer risk. They said there was plenty of money for use of the farmers with which to finance truck and tractor purchases, it being the determination of the bankers to urge upon them the advisability of using motor trucks and motor machinery.

Aside from Maxwell-Chalmers, Commerce Motor Car Co., Republic Truck and the Nelson Motor Car Co., and a few others, all of the factories in Detroit territory are working steadily. Republic Truck Co. expects to resume production about Sept. 15. Resumption of production at Maxwell-Chalmers is a question that rests entirely with the managing committee.

# Parts Makers Open Credit Convention

## Stabilizing Influences of Committee in Money Crisis Shown in Official Report

(*Continued from page* 586)

sistant treasurer of the Crucible Steel Co. of America, and R. B. McGraw, assistant treasurer of the Fisk Rubber Co., with Meyers a member *ex-officio* as general counsel.

The report reviewed its activities since its organization last year, told something of its aims and ideals, and the means taken to work them out, and contained a résumé of its accomplishments, which have been of surprising magnitude in view of the short time the work has been under way. It is doubtful if any single element in the industry has exerted so great a stabilizing influence since the readjustment period began.

Summarized: "It is the aim and object of the Credit Service Committee to represent, protect and safeguard the interests of the members of the association who are creditors of financially embarrassed companies, in matters ranging from temporary difficulties to receiverships and bankruptcies."

"Particularly in the last three months," says the report, "the disturbances in the automobile industry, flowing from the money stringency, credit curtailment, unbalanced inventories, transportation difficulties, slackened demand, and the general complexities of readjustment, have called the services of your committee into operation with increasing frequency."

The committee now is functioning in some 18 cases, in 11 of which major efforts were exerted in view of the magnitude of the embarrassment. Much of the work done has been of a confidential nature. In one case an indifferent receiver was supplanted by another who sold the property at a figure greatly in excess of the sum contemplated. In another case banking interests sought to dominate the receivership without consulting the merchandise creditors, and the committee brought influence to bear which resulted in a request from the bankers' committee for the appointment of a merchandise creditors' committee to work in co-operation with it. In a third case the committee brought about the appointment of a co-receiver to harmonize all interests. In still another it was asked to represent all interests.

The report outlined the functions of the committee as follows:

(1) "Investigates studies and analyzes credit gradings and reports on companies to whom members of the Association are selling, whenever there are indications leading to unusual caution in the extension of credit, or rumors or suspicion that embarrassment of some sort may develop.

(2) "Confirmation of this suspicion by direct communication with, and investigation of, the subject company, and by verification through experience of members.

(3) "Tender of good offices of the committee to the company to aid in a voluntary adjustment of the difficulties, through a proposal for the deferment of the claims of creditors, if warranted by the circumstances, or by other expedient action.

(4) "Appeal to creditors not to apply for receivership, pending full investigation.

(5) "Exertion of influence of the committee in the selection of a receiver, particularly as to fitness and his ability to produce the best harmony of interest among the stockholders, merchandise creditors and banking interests.

(6) "Communication with interested members concerning the developments in the case.

(7) "Request for claims and authority to represent creditors.

(8) "After appointment of receiver, keeping in touch with him on all developments.

(9) "The organization of a special committee of merchandise creditors to function in the particular matter, under the general supervision in an advisory capacity of the Credit Service Committee.

(10) "The co-operation of this merchandise creditors committee with the receiver in the construction and prosecution of a plan leading to either

(a) "Liquidation of the property, or

(b) "Reorganization on a permanent basis.

(11) "If the condition of the company, and the attendant circumstances appear to warrant liquidation, to do so in an orderly manner which will realize the maximum value of the estate and at the same time not tend to disrupt general trade conditions.

(12) "If reorganization is involved, to see that it shall be equitable in the adjustment of merchandise claims, banking claims and stockholders.

(13) "To estimate the interests of the stockholders, so as to obtain their full and active aid in the prosecution of any plan the rehabilitation of the company through refinancing, since that step would in all probability involve an assessment of the stock.

(14) "Upon the successful consummation of any such plan, the lifting of the receivership and the restoration of the company to its owners.

(15) "Filing of claims which frequently involves trial and proof of disputed items before Special Master, where claims are objected to by the Receiver.

### Committee for Greatest Good

Consolidation of claims, concentration of effort, unity of command, for the greatest good to the greatest number, constitute the real purpose of the committee. The report points out that unorganized individual creditors can accomplish little and that it is difficult for them to co-operate.

"The activities of the last year have been chiefly in the direction of laying the ground work, or, to change the figure, in building the skeleton structure," says the report. "The flesh and blood must be furnished by the members themselves, through reposing complete confidence in the Credit Service Committee, responding instantly to all its requests for authority and claims, and actively supporting and carrying out its recommendations.

## M. & A. M. A. Asks Probe of Wall Street Ring

CLEVELAND, Sept. 16—S. S. Meyers, general counsel of the Motor & Accessory Manufacturers Association, has asked the Department of Justice to investigate well-founded reports that a ring of Wall Street gamblers are circulating alarmist reports about automobile companies in order to depress stocks for speculative purposes. This ring is known to be selling short.

The decline this week in Republic Motor Truck Co. stock is ascribed to the manipulations of this ring. Not more than twenty companies are considered in real financial danger and they are all small.

# Heminway Reports Improvement Signs

## Cold Judgment, Not Cold Feet, Essential—Association Forms Traffic Bureau

CLEVELAND, Sept. 16—Belief that the present depression period has nothing especially fearful in it for the company conducting itself along safe business lines was expressed by M. L. Heminway, general manager of the Motor & Accessory Manufacturers Association, in a report to-day before the credit convention of the association in session here.

He summarized the policy of the association as "construction," not obstruction or destruction. Conditions to-day might be better, he said, but they are not as serious as some think. "It is no time to rock the boat," he asserted. "Cold judgment, not cold feet, is essential. Evidence points toward a clearing up of the present uncertainties and difficulties and I believe the whole industry will emerge in much healthier condition.

"In this connection," he continued, "I would emphasize the danger of repeating rumors. We all know how a chance opinion not supported by fact easily may be exaggerated through repetition until it becomes accepted as an authentic statement. This sort of thing creates disturbance of mind which if acted upon results in injury which could be avoided by calmer judgment.

"Don't overlook the fact," he said, "that other industries are affected adversely also—some of them more seriously than ours."

Development of the export department, he declared, was still under contemplation, but said the association was in position to be of some immediate assistance through contacts recently established in foreign centers. It would be good judgment, he said, for firms contemplating export business, to begin at once forming acquaintances abroad and be ready to take advantage of the market when it opens.

Traffic affairs of the association would now be handled through its own department, he announced. H. Deuster having been appointed to take charge of this work. Deuster, he said, had come with the association after preparation of eighteen years with two railroads. In connection with the opening of the new department Heminway expressed his appreciation of the assistance which had been extended the association through J. S. Marvin, traffic manager of the National Automobile Chamber of Commerce.

### FORD CHOOSES PLANT SITE

ST. JOHN, N. B., Sept. 10—It is stated that Lancaster, N. B., has been selected as the site of one of the three assembling plants that have been decided upon by the Ford Motor Co. in various parts of Canada. The entire scheme, it is understood, will involve the expenditure of approximately $5,000,000.

## Special Cables

# Production Tied Up at Italian Plants

### Manufacturers Willing to Make Concessions But Insist on Control—Government Passive

(By Cable to AUTOMOTIVE INDUSTRIES)

PARIS, Sept. 13—Radical workers remain in possession of the engineering plants in Italy, including all the automobile factories in that country. They also have seized the Michelin tire factory at Turin and the Pirelli tire plant at Milan, which had been in the possession of their owners, as well as many parts and accessory plants.

Strike sympathizers delivered over the railroad running into the Fiat factory 46 carloads of raw materials for the use of the Reds in control of the plant. The material had been lying in the railroad yards. Three citizens wandering near the Fiat plant were seized by the strikers and after being cross-examined by the workmen's tribunal were sentenced to work at the furnaces. After a day's toil they were released upon signing a statement admitting that anyone found near the works was liable to arrest by the strikers.

The workmen assert they intend to sell finished automobiles to pay their wages but this plan will be difficult of execution for it is difficult to find buyers for cars offered for sale by the Communists. Claims of the men that they are in production appear to be without foundation, for the Fiat shipping agents have not received a single automobile from the factory since the movement began.

**Rely on Lack of Finances**

President Agnelli of the Fiat company had a conference with Premier Giolitti before the aged prime minister started for the international conference at Aix-les-Bains. Agnelli said the manufacturers were disposed to make important concessions as to wages and working conditions but that they would refuse to consent to the control of their plants by the workers. Both the government and the employers have adopted a more or less passive attitude in the hope that the revolutionary movement will wear itself out. They place their main reliance upon the inability of the strikers to finance themselves.

The Reds show no signs of weakening as yet, however. They are bent upon syndicalist control of all factories and are determined to hold the whip-hand in their operation. In some respects the movement in Italy differs from that of Bolshevism in Russia but the Italians want to establish state communism.

While Northern Italy remains calm, large bodies of troops are held in readiness to put down disorders. There are 5000 soldiers in Turin with machine guns in position. Armored cars patrol the streets and citizens are forbidden to use automobiles.

**Paris Aviation Show Off**

There will be no aviation show in Paris this year as the manufacturers have nothing new to exhibit. It is probable the next exposition will not be held until December, 1921, or January, 1922.

**Sopwith Factory Closed**

The Sopwith aviation factory at Kingston, England, employing one thousand workers, has closed because of financial difficulties. Since the war the plant has produced the A.B.C. motorcycle.

**Close Successful Year**

The end of the first year of the Paris-London air service shows that 2101 trips were made and that 4339 passengers were carried with only one fatal accident, which resulted from a poor landing. Freight carried totaled 80 tons.

**Germany Pays Interest**

Berlin appears to be in a position to meet payments of interest amounting to about $4,000,000 on bonds and commercial obligations. In order to meet the situation, stocks of raw materials, especially wood, accumulated during the last two years, were sold.

**Wrangel to Get Trucks**

It is declared arrangements have been made to sell 5000 motor trucks to the Wrangel government in South Russia with payment in wheat. A Marseilles firm is endeavoring to put the deal through with the aid of the French government.

**Protest Grand Prix Rule**

French manufacturers are protesting against the clause in the Grand Prix race rules which would oblige them to submit to a preliminary engine test under which it would be necessary to produce 90 hp. at 3000 r.p.m. They want a straight rule calling for engines of 183 cu. in. piston displacement.

**NORWAY OPEN TO TRUCKS**

WASHINGTON, Sept. 13—The Department of Commerce has received a resume of the Norwegian Government's decree prohibiting the importation of goods classed as "luxuries." This includes motor cars for passenger traffic and motorcycles with or without side cars. It does not include trucks.

# Dirigible Service to Belgium Proposed

### Incorporation of Operating Company Early Development—Special Features of Ships

NEW YORK, Sept. 14—The Belgian Chamber of Commerce, with headquarters in this city, has undertaken to bring about the establishment of a dirigible passenger service between this city and Brussels. The negotiations are well past the preliminary stage and incorporation of an operating company is proposed for the near future. Captain-Commandant Crooy, who was the leading Belgian aeronaut in the war, is now on his way to this country to take an active part in the work.

One of the most prominent steamship companies in the country now is considering the advisability of financing the undertaking. By so doing it would come into direct competition with the Hamburg-American and American steamship interests which are backing a Zeppelin line which it is proposed to operate between Berlin and San Francisco.

The Belgians have arranged with the Belgian government for the use of the huge airship hangar erected near Brussels by the Germans during their occupation of the country. The present plan is for the purchase of a landing field somewhere on Long Island.

The dirigibles which it is planned to use will be built after designs by Henri Julliot, the veteran French airship designer, who designed more than 300 airships for the United States government during the war. Many of these craft were built at the plant of the B. F. Goodrich Co., but that corporation is understood to have abandoned this work.

M. Julliot proposes the construction of semi-rigid dirigibles, 1020 ft. long, with a total capacity of 6,357,000 cu. ft. of gas, and capable of carrying 200 passengers. He plans to have the keel so built that it will form the backbone of the huge gas bag. Beneath this keel will be the immense inclosed room which will be divided into cabins and saloons.

**To Carry 15 Liberty Engines**

The airship will have a maximum diameter of 102 ft., and will be of stream line shape. Its power plant would be composed of 15 Liberty engines generating 6000 hp. The estimated speed would be 100 nautical m.p.h. These engines will be arranged in five nacelles hung parallel to each other from the center of the keel.

One of the novel features of the engine nacelle is that all five will be equipped with an inflating device, set in the slip-stream of the propeller, to keep the envelope of the huge gas bag fully inflated at all times. Every possible precaution against fire has been taken in the design. Provision is made to store sufficient fuel for a non-stop flight of 90 hours at full speed, besides food to last a week.

# Bankers Urge Sales to Dealers on Time

## Would Have Factories Extend Same Terms as Given in Retail Transaction

NEW ORLEANS, Sept. 15—Financial conditions under which the truck and tractor dealers and distributers of the South, particularly those in New Orleans, are working, have virtually returned to normal. The general attitude of the banks has made the path easier for the truck and tractor man, as well as the salesman who installs home lighting systems and other power plants operated by internal-combustion engines.

The bankers of New Orleans are endeavoring, and the automobile dealers in general are helping them in the movement, to get the manufacturer to carry part of the deferred payment burden, by allowing the dealer or the distributer similar terms of payment which he, in turn, offers to the purchaser. Time enough has not yet passed to get the results of this movement.

Here is what the vice-president of one of the largest, and probably the wealthiest, bank in New Orleans said to-day:

"We are telling all the automobile dealers and distributers with whom we have done business in the past that conditions have settled down almost to normal, but we are urging them not to expand. The rice, cotton, sugar, wheat and corn crops must be cared for financially, and there must be money for their movements, both to markets, and through New Orleans and other gulf ports for export.

"Motor trucks and tractors are essential utilities; there can be no question about that, and the greatest aid that can be given the automobile industry right now should be given to them. The passenger car, as used in many businesses and industries, also is essential, and we are taking care of our established customers on passenger cars as well as trucks and tractors, but the passenger car dealer and distributer should slow up; indeed, he must slow up, if he is to get the help he needs from the banks in the South.

**Dealers Apply for Letters**

"One passenger car dealer of New Orleans—and he is one of the oldest, most solid and most prosperous dealers of the city, too—called on us this week for a letter telling him to slow up, a letter which he could show to the manufacturer of the cars he sells, and thereby aid himself in an effort he is making to have the manufacturer bear part of the burden of deferred payments. We have been urging this plan upon New Orleans and other Southern dealers for some time, that they should persuade their manufacturers to allow them to have cars on the same terms, or very nearly the same, on which they sell these cars to motorists.

"To my mind, the dealers are not doing as well with cash sales as they are with time payments, but this situation may clarify itself after the rice and sugar crops come in, when money will be more plentiful in all parts of the State. This is a State of seasonal crops, and the automobile dealers have great opportunities for cash sales after each crop is in, while they can conduct their campaigns during the planting and harvesting of the crops.

**Truck Credits Essential**

"The truck and tractor dealer, on the other hand, must do his selling, or the greater part of it, during the planting, cultivation and harvesting of the crops. At these times, for the most part, the farmers, no matter how expert they are, or how profitable their crops, seldom have much ready money. Therefore the truck and the tractor—since both are essential to the production and transportation of foodstuffs—must have help from the banks. So far, we have handled the truck and tractor distributers on a virtually normal basis, and I believe they are going ahead about as rapidly, probably on a more careful road, with a more solid foundation, as they were before the Federal Reserve Bank decided to restrict its members on automobile paper.

"My experience covers only the States along the Gulf coast, and should be considered as applying most closely only to those within the jurisdiction of the Atlanta branch of the Federal Reserve Bank. What is true of these States, however, also is largely true of the remainder of the South. I cannot stress too strongly, however, the fact that it is a time for 'slow-expansion,' if I may be permitted to use that combination of words, to keep the automobile, as well as other industries and distribution systems, on a sound basis, and I believe all the banks in the Southern part of the country, at least, are proceeding on that basis."

### BID $35,000 FOR EMPIRE AXLE

DUNKIRK, N. Y., Sept. 14—John P. Abbott, trustee in bankruptcy of the Empire Axle Co., Inc., of this city, has received an offer of $35,000 from Chester J. Parker for the assets of the company, which are subject to a mortgage of $112,000. Creditors must show cause at Dunkirk on Sept. 20 why the sale should not be made. The schedules filed by the bankrupt place the following values on the property to be sold: Real estate, $3,485; plant buildings, $70,989; stock in trade, $331,072; machinery and fixtures, $198,752; accounts receivable, $90,190. It is assumed Parker represents the Watson Products Corp. of Canastota, N. Y., which has controlled the Axle company.

### NEW PARTS COMPANY FORMED

SUPERIOR, Wis., Sept. 13—The Twin Parts Steel & Tractor Co. has been incorporated at Superior, Wis., with a capitalization of $10,000 to manufacture units and parts for tractors, gas engines, etc. The incorporators are F. J. Broghammer, A. R. Hollam and K. E. Hollam.

# Status of Industry Sought by Banker

## Conditions in Field to Be Studied Closely by Detroit Financial Official

DETROIT, Sept. 13—R. M. McConnell, vice-president of the National Bank of Commerce, leaves to-morrow for an extended trip through Western territory for the purpose of getting a close view of automobile and truck sales conditions. The results obtained from McConnell's trip are expected to enable the bank to more accurately judge the requirements of Detroit manufacturers, who are feeling the effect of the restricted credit conditions.

It is presumed McConnell also will endeavor to bring about a closer relationship between some of the dealers in the section most affected and the bankers in those territories.

While the effect of the tightening up of credits to dealers is being reflected in conditions at the factories, it admittedly is confined to the smaller companies and to the parts and accessory manufacturers. The larger factories, Dodge, Packard, Cadillac, Hupp, Studebaker, Paige and Ford in Detroit, as well as Buick, Reo, Oldsmobile and others out in the State, are moving along steadily, and in some instances increasing schedules and taking on employees. Similar conditions exist in the truck end, the ones most seriously affected being the smaller manufacturers out in the State. The only truck plants of any size that are out of production are Republic and Commerce.

Plans for an intensive sales campaign to overcome the depression and the apparent lack of demand are being formulated to-day at a meetng of Republic dealers from all over the country at the factory. Executives said last week the financial situation, particularly as it affects the dealers, would be given especial attention at the conference, and the dealers would submit minute reports of exact conditions as they exist in their respective territories. With these reports as a basis, a campaign of education to convince bankers of the unfairness of their attitude toward automobile and truck paper will be undertaken in conjunction with the vigorous sales plan that is expected to stimulate demand.

### NORTHWAY SEEKS EXPORT TRADE

BOSTON, Sept. 13—President Cavanagh of the Northway Motors, now that he has raised production of the Northway trucks to 100 a month, and has opened branch offices in a number of prominent centers, is looking into the prospects of exporting. With a factory on the Atlantic seaboard he feels the Northway Motors will be in an advantageous position, with no freight rates to pay from the Middle West to tide water, and the possibilities of getting shipments away quickly.

# French Buyers Wait Drop in Car Prices

## Failure of Demand Causes Production Slump—See Advisability of Exhibit

PARIS, Sept. 5 (*Special Correspondence*)—Trade conditions in France are decidedly dull. Three months ago the bottom dropped out of the truck market, for so many army vehicles had been unloaded that manufacturers found it difficult to sell new stock. Berliet, who had gone ahead on truck production on a big scale, was the most severely hit and found himself with 1000 unsold trucks on hand. Renault also held big stocks.

Two months ago the passenger car market went dead. Up to that time the demand had been strong and practically anything on wheels could be sold at fancy prices. Almost overnight the demand died out, and not only was it impossible to sell used cars but even those firms in production found that clients would not take delivery. Whereas three or four weeks previously clients were paying premiums to get delivery of new cars, when the slump came they refused to take delivery of cars even when offered at less than the catalog price.

The attitude of the public is rather difficult to explain. The idea seems to have got abroad that the price of automobiles, which has been increasing by leaps and bounds for the last eighteen months, is bound to drop down at the same rapid rate. The situation has been aggravated by increased cost of operating, for very heavy taxes have been applied, and gasoline is costly. At the present moment the gasoline situation has eased somewhat, but only a few weeks ago the average retail price was $2.25 per gallon.

Dealers report that clients refuse to come and take delivery of new cars on which they have paid deposits. This is confirmed by visits to showrooms and garages, where rows of new Citroens and Renaults are to be found. When the last increase in prices went into effect a few weeks ago, large numbers of orders were cancelled. One dealer reports that of 26 cars on order, 25 were cancelled when clients were informed of a further increase.

**Hundreds Out of Employ**

Since this movement went into effect manufacturers have cut down on production. Citroen, who had reached 70 per day and was expecting to get up to 100 by the fall, has dropped to 24 per day. Workmen have been laid off by nearly all the factories, and there are fears that a hard winter will have to be faced unless conditions improve rapidly.

It would be an exaggeration to call this movement a slump. It is nothing more than a temporary scare on the part of the buying public, and will only have serious effect if it continues. The fact that there are still only a small proportion of the factories in full production is proof that the market has not been swamped. The popular idea that prices will come down with a run if only clients will hold off buying for a few weeks is certainly erroneous. There may be a little price cutting, and Ford has already set the example in this respect, but it is certain that clients will not be able to buy cars at the low prices they were offered immediately after the armistice. The fact that all makers have increased their prices at least 100 per cent since their first announcements were made in early 1919 is one of the peculiarities of the European situation and reveals clearly the instability of the market.

**Regret Calling Off Show**

By reason of the events of the last two months the feeling is now rather widespread that a mistake has been made in not holding a Paris show this year. When they voted against a show French makers were so full up with orders that they did not see any possibility of regaining their leeway before two years. Now there have been so many cancellations that they are becoming nervous, and a show as a fillip to business would be more than welcome. It is entirely because they are all a full year behind on deliveries, and that all orders have not been cancelled, that the factories have been able to keep going during the last two months. It is known that some important French factories have not booked a single new order during a period of six weeks.

# Army Not Selling Serviceable Cars

WASHINGTON, Sept. 11—Because of the large number of inquiries received from every section of the country relative to the purchase of army passenger cars and trucks, E. C. Morse, director of sales, reports that there has been no change in the policy of the War Department in the sale of its automobiles.

"The War Department is not at this time offering for sale, either to ex-service men or others, any serviceable automobiles of any description," Morse said.

All motor vehicles of a serviceable nature which are not required for its own use must, under various acts of Congress be offered for transfer by the department to other Government bureaus to fill their requirements.

"Unserviceable army cars, with the exception of Cadillacs and Dodges, are offered to the public at irregular intervals by the Motor Transport Corps. These are sold at auction, and the sales are extensively advertised three or four weeks in advance, in the sections in which they are to be held."

**AMERICAN SPARK PLUG CHANGES**

MILWAUKEE, Sept. 13—The American Spark Plug Co. has changed its corporate style to Porcelain Specialty Co. It is moving its plant to Sun Prairie, Wis. Besides continuing the manufacture of spark plugs, it will make a general line of porcelain specialties.

# Lawson Planes Get Air Mail Contracts

## Will Combine Passenger Service on Three Important Routes Soon to Open

WASHINGTON, Sept. 14—Lawson Airline Co. of Chicago has been awarded contracts for three air mail routes at a total cost of $685,000 a year by the Postoffice Department. The contracts call for a service from Pittsburgh to St. Louis by way of Columbus, Cincinnati and Indianapolis at a cost of $147,000; between New York and Chicago via Harrisburg, Pittsburgh and Fort Wayne for $238,000 and between New York and Atlanta via Washington, Raleigh and Columbia for $300,000.

In conjunction with the award of mail contracts the Lawson company has announced that it will carry passengers as well as mail. The first service, Pittsburgh to St. Louis, will start in November. Air liners are being built with wicker chair parlors enclosed in glass windowed, stream-line bodies. Sixteen passengers can be accommodated in addition to whom the company must carry 1500 lb. of mail per trip as per contract. The passenger feature of the business in a private venture. Round trips, totaling 306 a year, are to be made on each route.

Service on the other two lines probably will not be inaugurated until spring. Connecting air lines between Cleveland, Detroit, Chicago and Indianapolis probably will be opened later when the company will also bid for mail carrying contracts.

# Steel Mills to Build Slag Disposal Road

YOUNGSTOWN, Sept. 13—Tens of thousands of freight cars, it is claimed by railroad men, will be released for use of general freight service by the construction of a slag disposal railroad by the steel mills of the Mahoning Valley. This plan is announced as already sure of development by mid-winter. Extensive orders for open top dump cars have been placed by the steel companies, to supply cars for rail purposes for which the railroads had declared they had no cars available.

The local car distribution committee asserts that this will make possible early return to automobile manufacturing centers of several hundred cars a month from this district. Heretofore these cars had been turned partly into other traffic lines to help replace those cars used in hauling slag from the steel plants and limestone to the plants.

The road purposed by the steel companies will handle both of these shipments with steel company cars. The plan of the steel companies is to dump the slag into quarry holes, although road engineers in this territory have experimented and found slag to be an admirable road building material.

# Case Plow Reports Earnings of $783,365

## Estimated Return Had Been Placed at $1,250,000—Exceeds Two Year Average

RACINE, WIS., Sept. 11—Net profits shown in the first annual report of the J. I. Case Plow Works Company of Racine, Wis., as at present organized, issued to-day for the fiscal year ended June 30, 1920, are below the estimates made by officials some months ago. Before Federal taxes the net income for the year was $783,365. This compares with an estimate of $1,250,000, but it is well up to the results of previous years, the combined net profits of the predecessor company, the J. I. Case Plow Works, for the two years and of the Wallis Tractor Company for the two and a half years ended June 30, 1919, having averaged $755,787 per annum.

After allowance for Federal taxes and for full year's dividends on the first and second preferred stocks, on which only three quarterly dividends were paid from last year's income, the balance for the year would be $183,359, which is equal to $1.14 a share on the 125,000 shares of common and 35,000 shares of second preferred, the latter sharing equally in any dividends received by the common.

The income account shows:

| | |
|---|---|
| Net sales | $11,006,882 |
| Cost of sales and other expenses | 9,946,063 |
| Net earnings | 1,060,808 |
| Other income | 141,230 |
| Total earnings | 1,202,048 |
| Depreciation | 277,742 |
| Interest | 140,941 |
| Balance before federal taxes | 783,365 |
| Federal taxes, estimated | 110,000 |
| Net profit for year | 673,365 |
| Preferred dividends (3 quarters) | 367,500 |
| Surplus for year | 305,865 |

The balance sheet as of June 30, last, follows:

ASSETS.

| | |
|---|---|
| *Current assets and inventories | $7,686,512 |
| Deferred charges | 154,316 |
| Liability insurance fund | 15,300 |
| Investments | 1,000 |
| Plant and properties | 3,934,939 |
| Original drawings, tracings and designs | 650,000 |
| Good will | 2,000,000 |
| Total assets | $14,442,067 |

LIABILITIES.

| | |
|---|---|
| Notes payable | $2,770,000 |
| Accounts payable | 958,710 |
| Federal taxes accrued | 110,000 |
| Reserves | 1,023,778 |
| First pref. 7% cumulative stock | 3,500,000 |
| 2d pref. 7% noncumulative stock | 3,500,000 |
| Common stock, 125,000 shares of no par value | 2,273,713 |
| Undivided profits | 305,865 |
| Total liabilities | $14,442,067 |

* Includes inventory, $3 505,843; cash, $474,473.

### FRANKLIN ANNOUNCES TRUCK

SYRACUSE, N. Y., Sept. 15—Formal announcement is made by the H. H. Franklin Mfg. Co., makers of the Franklin car since 1902, that it will re-enter the truck field with a one-ton pneumatic tired truck which, like the Franklin car, will be air cooled. It will embrace many other Franklin features, including full elliptic springs and a good sill with a four-cylinder engine.

Separate quarters have been engaged in Syracuse for experimental work on the new truck and the engineers in charge say they are well pleased at the way in which the new truck has stood up under road tests. The vehicle is designed especially for use in agricultural districts.

The Franklin company manufactured a truck as well as a passenger car until 1912 when it abandoned the commercial vehicle to center all its energies on the car.

## Stir Caused by Heavy Republic Stock Sales

NEW YORK, Sept. 15—Something of a flurry was caused in Wall street yesterday and to-day by feverish activity on the Stock Exchange in the stock of the Republic Motor Truck Co. More than 10,000 shares were sold in less than half an hour, and the stock broke nearly five points at its lowest level. It opened yesterday morning at 30⅜ and closed tonight at 27¼. Reports in the street that the company was in serious financial difficulties were promptly and positively denied by representatives of John N. Willys, who controls the company, who now is in Europe.

There was considerable speculation as to the source of the stock which was being sold. One explanation accepted as plausible was that it was being put on the market by the former owners of the Torbenson Axle Co., which accepted 13,800 shares of Republic common in exchange for the Torbenson company. These same interests are now closely associated with the Standard Parts Co., which is in receivership.

### VAN BRIGGLE NOT CONNECTED

INDIANAPOLIS, Sept. 15—Officers of the Van Briggle Motor Device Co., with a factory in this city, deny that there is an affiliation or connection between their company and the Van Briggle Mfg. Co., makers of the Van Briggle trailer, which went into the hands of a receiver Aug. 30. The Motor Device company manufactures carbureters and shock absorbers. Announcement of the appointment of a receiver for the Van Briggle Mfg. Co. was made in AUTOMOTIVE INDUSTRIES of Sept. 9, with the statement that the Van Briggle interests were affiliated.

### MENOMINEE OPENS NEW PLANT

CLINTONVILLE, WIS., Sept. 13—The new plant of the Menominee Motor Truck Co. here began regular operations during the week at a capacity of 50 trucks per month, which will be increased to 100 a month by next spring. The equipment of the original plant at Menominee, Mich., has been transferred to Clintonville and supplemented by a large complement of new tools and machinery. The Menominee company recently was reincorporated with $500,000 capital in Wisconsin. Stockholders in the F. W. D. Automobile Co. largely own the stock, and the distribution will be effected through the sales organization of the F. W. D. company.

# METAL MARKETS

ONE by one, the obstructions that have so far obscured the outlook in the metal markets are disappearing and it is now possible to see beyond the current year. In the pig iron market, the fact that the Illinois Steel Co. has fixed a price of $39, Milwaukee, for last quarter malleable or foundry, together with offers by the Tennessee Coal and Iron and Railroad Co. of foundry at $38, are straws that show conclusively which way the wind is blowing in what sellers confronted with inquiries from supposedly spot buyers, still call a $50 market.. In the steel market, orders now on the books of mills and what business may be conservatively anticipated over the remainder of the year, should keep them in operation until about the time that either Mr. Cox or Mr. Harding has made himself at home in the White House. Men of long vision in the steel market opine that concurrent with the change in the national administration, mills and furnaces will have reached a period of impressive inactivity and that then the slate will be clear for a thoroughgoing revision of prices, taking the changed order of things into consideration. The non-ferrous metal markets also display a drooping tone, the general apathy of buyers and sellers offering the only explanation for prices not giving way further. All in all, it would seem therefore, that the automotive industries which have more or less turned their back upon the market, are not the losers by their leisurely attitude toward offers.

**Pig Iron**—What business is passing is usually on the basis of price to be adjusted at time of delivery on the basis of the then prevailing market quotation. The Westinghouse Electric & Mfg. Co. bought 2,000 tons of No. 2 and 3 foundry for equal monthly shipments over the remainder of 1920 on this basis.

**Steel**—Business papers reports have it that a Canton (O.) manufacturer of roller bearings has asked the suspension of 12,600 tons of electric steel on the books of the Illinois Steel Co. Further suspensions and cancellations of orders for cold finished steel bars by automotive interests are reported from Pittsburgh. It is known, however, that 600 tons of large-sized bars have just been ordered by an automotive interest for shipment by Oct. 1. Youngstown sheet interests report that they were notified by a large producer of low priced passenger cars that his output for the current year would be at a rate approximately 40 per cent higher than during the past twelve months and that sheet shipments were to be made accordingly. All in all, there is a lull with price movements held in uninteresting boundaries.

**Aluminum**—Foreign ingots continue to be offered at prices relatively lower than those quoted for virgin metal by the sole American producer. Consumers, however, are but little interested in these offerings. Inquiry for sheets continues fair.

**Copper**—Producers sought in vain to stimulate the market by offering metal at 18¾c. Resellers are unable to find buyers at 18c. for electrolytic.

**Tin**—It is significant for the tin market that a wager was made a few days ago by two metal exchange members, one claiming that Straits tin would fall to 42½c. this month and as low as 40c. before the end of the month and the other that this would not happen. Apparently others are making similar wagers by selling the market short.

**Brass**—Rolling mills are operating at more normal capacity.

# Automotive Financial Notes

**Pierce-Arrow Motor Car Co.** earnings for the quarter ending Sept. 30 will probably not exceed $600,000 or approximately $1.50 a share on the common stock after allowance for preferred dividends. This compares with net profits of $705,779 or $2.02 a share, in the preceding quarter, and $717,265 or $2.07 a share, in the first quarter of the year. For the full twelve months results should equal those of 1919 when net profits after all charges were $2,491,070 or $6.75 a share on the common.

**United States Rubber Co.** earnings in the first half of 1920 were equal to 13.68 or at the annual rate of 27.36 per cent a year on the $81,000,000 of common stock, after charges including dividends on the preferred stock and dividends on minority stock holdings of subsidiary companies. Total sales for the six months were $129,588,986. An application to list $20,000,000 in gold notes on the stock exchange has been granted.

**Fisher Body Corp.** reports surplus after charges and Federal taxes of $2,221,553 for the three months ending July 31. The amount is equal to $4.29 a share on the 500,000 shares of no par common stock outstanding, after allowance for preferred dividends. A total of $3,673,642 after reserves for repairs, maintenance and depreciation is reported in the consolidated statement of the corporation and its subsidiaries.

**International Motor Truck Corp.** reports earnings in the June quarter at the annual rate of $4,781,000, or 12.6 per cent on the junior issue. For the half year earnings on the common totaled $5.65 a share with the probability that all of 1920 will show $12 a share on the junior issue.

**Elgin Motor Car Co.** stockholders have voted to increase the capital stock from $2,000,000 to $5,500,000, the new capital to be used for additional factory buildings to increase production. Officials of the company stated that a liberal dividend would probably be declared in the near future.

**Wall Pump & Compressor Co.,** has been incorporated in Illinois with a capital stock of $200,000 for the manufacture of high speed vertical dry vacuum pumps, gas engine governors and air compressors. The factory will be at Quincy. Officials are G. A. Wall, Leaton Irwin, Mac Irwin and G. W. Gillo.

**Sharon Pressed Steel Co.** has obtained two large tonnage orders, one for 25,000 steel frames from Ford Motor Co. and one for 5,000 frames from Cadillac Motor Car Co. Stockholders will meet Nov. 1 to approve an increase in capital from $400,000 to $2,000,000.

**Weaver Aircraft Co.** has been incorporated in Ohio with a capital of $125,000 to manufacture aircraft. Incorporators are G. C. Weaver, E. J. Jenkins, C. J. Bruckner, H. C. Dentler and M. Ohm. The factory will be at Lorain.

**Virginia Rubber Co.,** Charlestown, W. Va., will ask permission from the secretary of state to increase its capital stock from $1,200,000 to $2,500,000. The new stock will include $850,000 in 7 per cent preferred and $450,000 in common stock.

**Parker Motor Car Co.** has been incorporated in Winnipeg, Man., to manufacture automobiles, etc., with a capital stock of $3,000,000. The incorporators are Frederick W. Louthood, Reginald E. Forde, William A. Deacon and others.

**Anglo-American Motors, Ltd.,** has been incorporated in Toronto, Ont., to manufacture engines, etc., with a capital stock of $10,000,000. The incorporators are John P. Ebbs, Duncan R. Kennedy, Edward R. Jackson and others.

**Commerce Motor Car Co.** will offer $100,000 in new stock to shareholders at par of $10. The proceeds will be used as additional working capital. When the distribution is completed the capital will total $700,000.

**Sewell Cushion Wheel Co.,** Detroit, reports an increase in business for the first six months of 1920 of 136 per cent over the first six months of 1919. The total for this year approximated $1,000,000 while in 1919 the total was $424,000.

**American Pressweld Radiator Corp.,** capitalized at $164,000, filed dissolution papers this week, as the charter had expired and the firm plans to go out of business. Dissolution will be authorized Oct. 18.

**Thomart Motor Co.,** Kent, Ohio, has completed its first light delivery speed truck and expects to be in general production within a short time.

**Oldsmar Tractor Co.** will increase its capital from $100,000 to $500,000 to permit of an increase in production to 10,000 machines in 1921.

**Hupp Motor Car Corp.** directors have declared a quarterly dividend of 1¾ per cent on the 7 per cent cumulative preferred stock, payable Oct. 1.

**B. F. Goodrich Co.** directors have declared a quarterly dividend of $1.75 a share on preferred stock, payable Oct. 1, and a quarterly dividend of $1.50 on common, payable Nov. 15.

**Crofoot Gear Works, Inc.,** has opened its new factory in Boston.

**Shuler Axle Mfg. Co.,** Louisville, is planning the erection of a $1,000,000 factory.

## Hupp Motors Shows $2,668,299 Net Profit

DETROIT, Sept. 10—Hupp Motor Car Corp. made the best showing in its history in the fiscal year ended June 30. Net profits after all charges and Federal taxes were $2,668,299, or five times as much as net profits of $535,602 in the preceding year, and four times greater than profits of $836,691 in 1918, the best previous year. After deduction of preferred dividends profits in 1920 aggregated $2,601,713, or 5.01 a share on the 519,200 shares of $10 par value common stock. This compared with 87 cents a share earned the previous year.

At the beginning of this year the common stock was placed on a 10 per cent annual dividend basis.

As a result of the company's purchase of 80 acres adjoining the Detroit plant, acquisition of a controlling interest in the Detroit Automobile Specialty Corp. and the extensions to both its plants at Detroit and Jackson, Hupp Motor's last balance sheet carries property account at $3,192,326, compared with $1,394,213 in the preceding year. No new financing was necessary to provide the requisite funds as current earnings were sufficient.

Total current assets as of June 30, 1920, were $7,667,317 and current liabilities, $4,154,262, leaving net working capital of $3,513,055, an increase of $1,000,000 over the former year's total. Profit and loss surplus was shown as $4,002,344, compared with $1,660,236 the year previous.

## *Bank Credits*

*Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, Sept. 16—The successful floating of the $100,000,000 French loan last week, which was greatly oversubscribed, seems to indicate that there are reserve funds available for investment at rates corresponding to the existing stringency in the money market. The uncompromising attitude of the Government toward the demands of the anthracite coal miners and the reopening of the woolen mills with prices adjusted to new conditions have contributed to general confidence in the permanency of the progress being made toward a greater degree of stabilization in industry.

The week-end statement of the New York Clearing House institutions showed a further decline in loans, discounts, etc., of $18,514,000. Against this was an increase in net demand deposits of $24,260,000. This increase, it is said, was due to the deposit of funds received from the advance retirement of U. S. Certificates of Indebtedness held by customers of the banks. This is the first instance of advance retirement of these certificates since the Government resorted to temporary financing. Cash in vaults increased $6,343,000; excess reserves over legal requirements decreased $1,863,620; and bills payable declined $34,133,000 from the record high of $1,215,492,000 of the week before.

The Federal Reserve Banks showed an improved reserve position, as revealed by the weekly statement. The decline in net deposits of $55,671,000 was offset by the increase in Federal Reserve notes in circulation of $51,905,000. However, bills discounted secured by Government war obligations declined $33,769,000, and total bills discounted were less by $66,247,000. Cash reserves were larger by $13,290,000. Accordingly, the ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against net deposits, increased from 46.6 per cent (week before) to 46.8 per cent. Total earning assets declined $13,453,000.

The New York Federal Reserve Bank brought about an improvement in its reserve position by purchasing from its members and selling back to the Boston and Cleveland Reserve Banks $45,000,000 Treasury Certificates, gaining corresponding credits in the Gold Settlement Fund. At the same time the members were able to reduce their loans with the proceeds of the sales.

# Men of the Industry

**Seymour deB. Keim,** sales and advertising manager of Rolls-Royce, American organization, has just returned from a trip to England and France, in the interests of the company. Keim reports that owing to increased costs of manufacture the prices of all English cars have advanced considerably, and although the comments he heard on the English motor car business indicated a somewhat quiet condition, the Rolls-Royce works at Derby, which he visited are very busy and cannot book an order for delivery before April, 1922. He also states that the limited production in America is nicely under way and ahead of the schedule, with orders to correspond.

**C. L. Fox,** for six years sales manager for the Saxon Motor Car Co., has joined the Lincoln organization as assistant to R. C. Getsinger, general sales manager. Fox takes the position made vacant by the transfer of A. A. Lord to the Detroit Lincoln branch as sales manager. Fox began his career in the automobile field with Saxon. When the Lelands began looking around for the most available men with which to complete the personnel of their organization they selected Fox for inauguration of their selling campaign.

**William A. Leonard** of Chicago has been elected vice-president and general manager of the Imperial Brass Mfg. Co. of that city, makes of Imperial oxy-acetylene welding equipment and a general line of automobile accessories and brasswork. Until recently Leonard was associated with Belding Brothers & Company, of Chicago and New York as organization and sales promotion manager. This election completes the sales organization.

**J. D. Siddeley,** managing director of Armstrong-Siddeley Motors, Ltd., Coventry, England, is visiting important motor centers in the United States and Canada. This is Siddeley's first visit to this country, although other members of his firm have previously visited centers of the industry here. During the war Siddeley's factory was largely engaged on aircraft engine manufacture and war munitions.

**Jackson H. Simms** has resigned as vice-president and general manager of the Simms Motor Car Corp. according to announcement by the Board of Directors. Other changes in the company's personnel are to be announced later, according to the board. Simms has sold his entire holdings in the company and is succeeded as vice-president and general manager by H. L. Innes.

**Fred P. Scribner,** who was for many years the superintendent of the Staybestos plant in Bridgeport, and who, for the last eleven years has been superintendent of the F. L. Horton Mfg. Co., of Boston, Mass., has recently taken an interest in the Staybestos Mfg. Co., of Philadelphia, and is now superintendent of this plant.

**Albert J. Romer,** who developed the original designs of the Roamer and Murray motor cars, is now associated with the Northway Motors Corp., and is devoting his time to the designing and production of the chassis and bodies for the line of passenger cars which this Massachusetts company plans to produce.

**Honor C. Blocker,** advertising manager for the Republic Rubber Corp., Youngstown, Ohio, has severed his connection to join the Thomas Cusack Co., national sales department in Cleveland. Blocker came to Youngstown from Akron and has been associated with the tire industry for a number of years.

**Walter F. Zimmer Co.,** Detroit, after Sept. 1, will be known as Zimmer-Thien, Inc. The change is one in name only as the personnel of the organization remains as formerly. Walter F. Zimmer is president and treasurer; Robert R. Thien, vice-president and Kenneth H. MacQueen, secretary.

**Paul D. Davis** has been appointed advertising manager of the Packard Motors Export Corp., New York. Davis is a specialist in foreign advertising, having been export advertising manager for the Firestone Tire & Rubber Co. for the past two years.

**John M. Stockfish,** formerly a sales representative for the Tide Water Oil Sales Corp. and recently a sales agent for gasoline, has become sales manager for the Lubricating Oil Division of the Associated Oil Co. of St. Louis.

**Fred D. Rice** has joined the forces of the Eaton Axle Co., of Cleveland. Rice was formerly with the Hess Steel Corp. His new duties will keep him in touch with automobile manufacturers in the Eastern territory.

**E. H. Williams,** general foundry superintendent of the Stewart-Warner Speedometer Co.'s works at Beloit, Wis., has resigned to accept the position of works manager of the Stanley Flagg Co., Philadelphia.

**Warren M. Zerby** has been appointed traffic manager of the Briscoe Motor Corp. Zerby was for several years attached to the traffic department of the Michigan Central Railroad, Chicago offices.

**E. G. Poxson,** export sales manager of the Dort Motor Car Co., is leaving on a trip to Europe on which he will visit Dort distributors there and make a general survey of the automobile market.

**Frank R. Wood** has resigned as service manager of the H. J. Koehler Motors Corp., Newark, N. J., to take up duties in the service department of the Atterbury Motor Car Co., Buffalo.

**John Tainsh** has been placed in charge of Mitchell sales to succeed Rueschaw. Tainsch has been sales manager of the company for four years and has been highly successful.

## Maxwell-Chalmers Seek Final Determination

NEW YORK, Sept. 16—Another meeting of all the Maxwell-Chalmers interests is being held to-day and it is expected a definite announcement regarding reorganization and refinancing will be made by the first of next week. Unexpected obstacles developed at the meeting a week ago which was expected to bring the negotiations to an end and the conference to-day will be the second this week. The stumbling block last week is understood to have been the management of the company under the reorganization and there is reason to believe certain changes which were demanded will be made. These have nothing to do with the management committee headed by Walter P. Chrysler. The financial readjustments which have been worked out and which were outlined in AUTOMOTIVE INDUSTRIES last week are said to be entirely satisfactory to the principal interests and undoubtedly will be adopted with perhaps some slight modification. It is perfectly safe to predict that the merger will be accomplished in the near future and that ample funds will be provided to insure the future of the two companies.

## No Injunction Against Builder of Holmes Car

CHICAGO, Sept. 10—The Holmes Mfg. Co. of Bridgeport, Conn., against whom an injunction was secured to prevent it from building or selling any air cooled engine embodying the essential features of the product of the Cameron Motors Corp. is in no way connected with the Holmes Automobile Co., manufacturers of the Holmes air-cooled cars. The infringement in question has no connection with the cooling system used by the latter concern.

"The name Holmes Mfg. Co. being so similar to the name Holmes Automobile Co.," says W. E. Butler, president of the Holmes Motor Car Co. of Chicago, distributers of Holmes automobiles, "and the fact that they were building an air-cooled motor has undoubtedly led a great many people to believe that the Holmes Mfg. Co. were building the Holmes 'air-cooled' automobile."

The Holmes Automobile Co. has no knowledge of the Holmes Mfg. Co. against whom the injunction was issued and is operating its system under patents fully protected.

### FRUEHAUF PRESENTS BONUS

DETROIT, Sept. 13—Employees of the Fruehauf Trailer Co. were presented with the quarterly bonus by company officials at a banquet at Westwood Inn Thursday night, the bonus being the largest yet distributed by the company. This, too, in face of the fact, according to A. C. Fruehauf, that the organization practically had been doubled in the last six months. Salesmanagers from the western, southern and New England districts were present at the banquet, and told of the conditions in the respective sections, which they said rapidly were emerging from a period of depression with prospects for a steady return to normal.

### BESSEMER MERGER OFF

LONDON, Sept. 3 (*Special Correspondence*) — The recently reported fusion of the Bessemer Steel interests at Sheffield with the A. G. E. (Agricultural and General Engineers) combine, has failed to receive the Bessemer's stockholders sanction. Of the 87 per cent assents required, only 73.9 per cent were secured, despite the tempting nature of the offer, which was in the ratio of 9 to 1, the shares being of $5 denomination each.

### IMMEL RECEIVER NAMED

COLUMBUS, Sept. 15—R. H. Schryver, a Columbus banker, has been appointed receiver for the Immel Co., an automobile body manufacturing concern,

# Calendar

### SHOWS

Sept. 18-25—Cincinnati, Annual Automobile Show, Passenger cars only, Cincinnati Automobile Dealers' Ass'n. Music Hall Buildings.

Sept. 20-26—Los Angeles, National Tractor and Implement Show of the West, Tractor and Implement Dealers' Ass'n of Southern California. Guy H. Hall, Mgr.

Sept. 27-Oct. 2—Buffalo, Closed Car Show, Buffalo Automotive Dealers' Ass'n, Elwood Music Hall, C. C. Proctor, Mgr.

Oct. 4-9—Little Rock, Ark., Enclosed Car Show, Little Rock Automobile Dealers' Ass'n.

Oct. 5-9—Minneapolis, Enclosed Car Show, Minneapolis Automobile Trade Ass'n.

Oct. 6-16—New York. Electrical Show. Grand Central Palace. George F. Parker. Manager.

Nov. 14-21—New York, Automobile Salon, Commodore Hotel Ballroom.

Nov. 15-20—Chicago, Automotive Equipment Show, Coliseum, Automotive Equipment Association.

Dec. 10-18—New York. Motor Boat Show. Grand Central Palace.

Jan. 8-15—New York. National Passenger Car Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 29-Feb. 4 — Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.

Feb. 5-12—Minneapolis, Annual Automobile Show, Minneapolis Automobile Trade Ass'n.

Feb. 6-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.

### FOREIGN SHOWS

October—London. Commercial Vehicle Show, Olympia.

Nov. 4-13—London, International Motor Exhibition. Society Motor Mfr's and Traders, Ltd., Olympia and White City.

Nov. 6-13—Christchurch, N. Z., Olympia Motors Exhibition.

Nov. 29-Dec. 4—London, Cycle and Motorcycle Show, Cycle and Motorcycle Mfr's and Traders Union, Ltd., Olympia.

Jan. 7 — Sydney, Australian Motor Show.

### CONTESTS

Sept. 17-18—Syracuse, N. Y. Dirt track.

Sept. 25—Allentown, Pa. Dirt track.

Oct. 1-2—Trenton, N. J. Dirt track.

Oct. 8-9—Danbury, Conn. Dirt track.

### CONVENTIONS

Sept. 16-17—Cleveland. Motor and Accessory Manufacturers' Ass'n. Credit Convention.

October — Cleveland, Service Managers' Convention, National Automobile Chamber of Commerce.

Oct. 11-13 — Chicago, National Association of Purchasing Agents' Annual Convention.

Oct. 20-22 — Atlantic City, Twenty-seventh Annual Convention National Implement and Vehicle Association, Hotel Traymore.

Dec. 7-10—New York. Annual meeting American Society of Mechanical Engineers. Engineering Societies Building.

Dec. 8-9 — Cincinnati, Annual Convention, Ohio Automobile Jobbers' Association

Jan. 11-13—S. A. E. Annual Meeting, New York City.

## Jersey Owners Oppose Increase in Licenses

NEWARK, N. J., Sept. 14—Unalterable opposition to an increase in motor vehicle fees proposed for enactment at the next session of legislature in New Jersey was expressed at a meeting of the Motor Truck Club in this city last night. As a means of expressing its opposition the club will ask for a hearing before the legislative committee which has the proposed amendment in charge.

Under the proposed change a graduated fee based on horsepower would supplant the present rate on passenger cars of $7.50 up to 29 hp. and $15 over that figure. On motor trucks it is charged the rate would be almost prohibitive to the operation of heavy duty vehicles. In the case of trucks of 28,000 lb. capacity the rate would be changed from $59 to $300 and similar proportionate increases would be made in all vehicles.

The National Automobile Chamber of Commerce was represented at the meeting by W. Eugene Turton, who also appeared as an official of the Associated Automobile Clubs of New Jersey and of the State Chamber Federation Committee on Highways. The consensus of the meeting was that no increase in present rates would be justified unless the resulting funds were devoted exclusively to highway improvement.

At the last session of the New Jersey legislature an amendment was proposed effecting a heavy increase in automobile and truck fees which was abandoned in favor of a 20 per cent surcharge on all vehicles for the current year. This surcharge was also subsequently abandoned.

### YOUNGSTOWN PLANS ROADS

YOUNGSTOWN, Sept. 13—Through combined action of the Automobile Club and the Automobile Dealers' Association the Mahoning County Commissioners have promised to devote every attention to building new roads, when possible and wherever possible, but to give first attention to maintaining and rebuilding of the main arteries of travel. One of the first roads to be permanently improved is the main road from Youngstown north to Ashtabula. Construction will start this fall, the road to be completed next spring before heavy motorist travel to the lake resorts opens up. Three contracts on this road have been let, totalling $212,650.

## No Change in Rules for Show Space Drawing

NEW YORK, Sept. 13—Drawings for spaces at the New York and Chicago automobile shows will be held Oct. 7 at the headquarters of the National Automobile Chamber of Commerce in New York. Applications for space, blanks for which already have been sent out, must be filed not later than noon Oct. 2.

Rules governing allotment of space have been changed little from those prevailing in former years, members of the N. A. C. C. and of the Motor and Accessory Manufacturers' Association having preference. Space per square foot at the New York show, Grand Central Palace, Jan. 8-15 will run from $1.10 to $1.50 and at the Chicago show, Coliseum, Jan. 29-Feb. 5, from 75 cents to $1.25.

### HIGHWAY COUNCIL TO MEET

AKRON, Sept. 14—The Federal Highway Council will meet in this city Sept. 27 and 28. Special consideration will be given to the formation of a plan by which the importance of national highways can best be brought to public attention. The work that the council has already done and its plans for the future will be shown in motion pictures at the meeting. Representatives of all the big automotive industries are expected to be in attendance.

## Show Space All Sold for Belgian Exhibit

PARIS, Sept. 5 (*Special Correspondence*)—Every available inch of space has been rented for the first Belgian post-war automobile show, to be held in the Palais du Cinquentenaire, Brussels, Dec. 10 to 19. The show is international and devoted to the entire automotive industry. There will be 64 car exhibitors, 72 accessory stands, 18 tire manufacturers, 8 truck makers, 7 agricultural tractor exhibitors, 6 in the stationary engine class, and 20 in the bicycle and motorcycle section.

French car manufacturers dominate with 31 individual exhibits. Belgium only has 9 car manufacturers in the show. Italy will be represented by Fiat, Bianchi, Isotta-Fraschini, Spa, and by the Ansaldo Co., which has just entered the automobile field. American cars to be placed on exhibition are Comet, Maxwell, Chalmers, Paige, Westcott, Dodge, Buick, Chevrolet, Overland, Packard and Oldsmobile. American tire firms are Fisk, Goodrich and United States. In addition, American accessory manufacturers will be well represented by Brussels dealers.

The Belgian show assumes considerable importance this year by reason of it being the only one to be held on the Continent of Europe.

### MIRROR LAW RULED OUT

LOUISVILLE, Sept. 13—The law requiring motor trucks to be equipped with mirrors at the driver's seat was held unconstitutional by Chief Justice Carroll this week, overruling the motion of Attorney General Dawson to dissolve an injunction granted against the State Tax Commission.

Judge Stout, Franklin Circuit Court, granted the injunction on the ground that the act of 1920 was an amendment to an existing law, and the law as amended should have been set out in full.